May 1946

Chemical Industries

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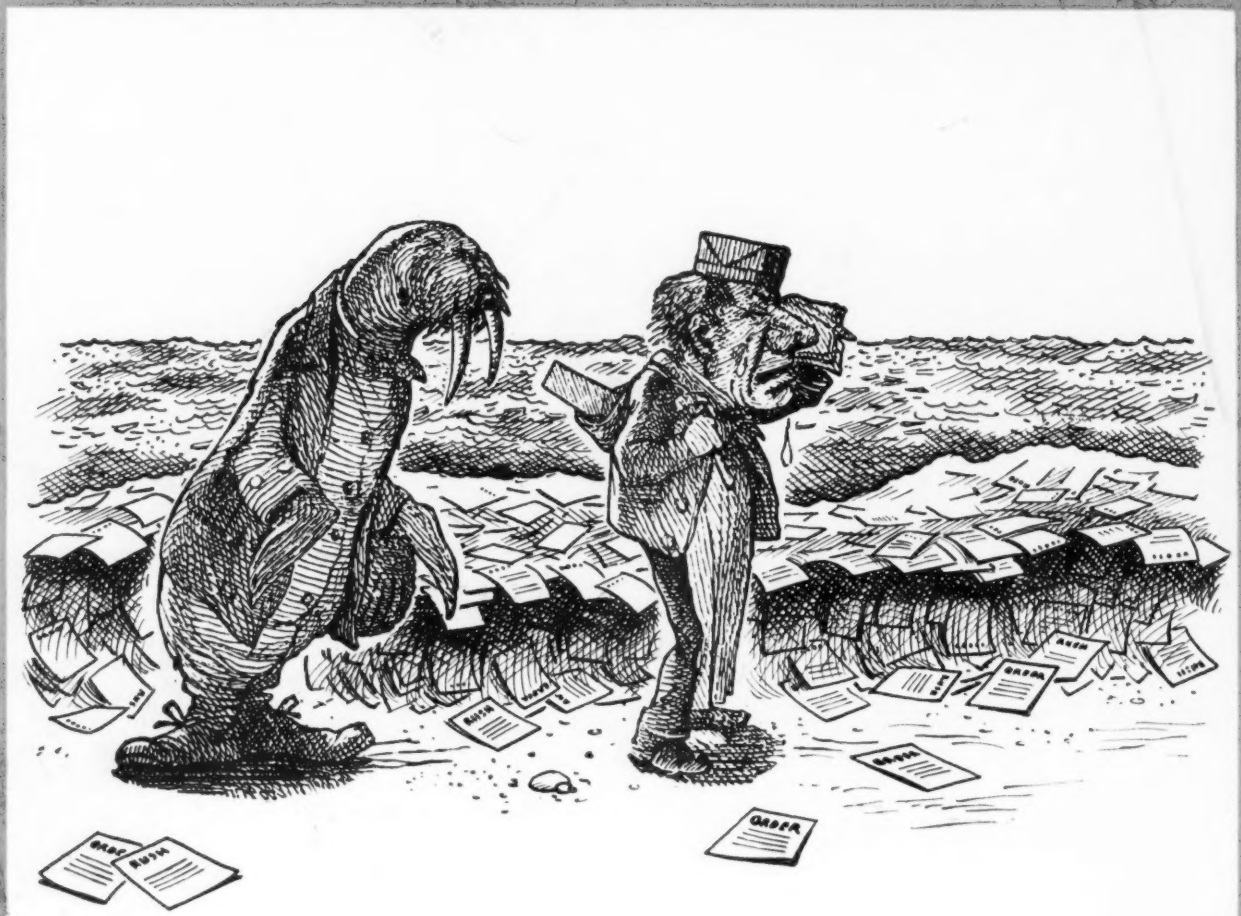

"Do you suppose," the Walrus said,
"That they can get it clear?"

"If seven maids with seven mops
Swept it for half a year,
Do you suppose," the Walrus said,
"That they could get it clear?"

(with apologies to
Alice in Wonderland)

We are making every effort to carry on our long-established practice of making prompt deliveries, but in spite of this, we cannot avoid some delays at the present time. So if your orders do not arrive as quickly as you would like, remember that we are trying—as our artist puts it—to mop up the tide of orders as fast as we can without sacrificing any of the traditional SOLVAY quality. We appreciate the loyalty and cooperation of our customers and hope that before long we will again be in a position to promise immediate delivery.

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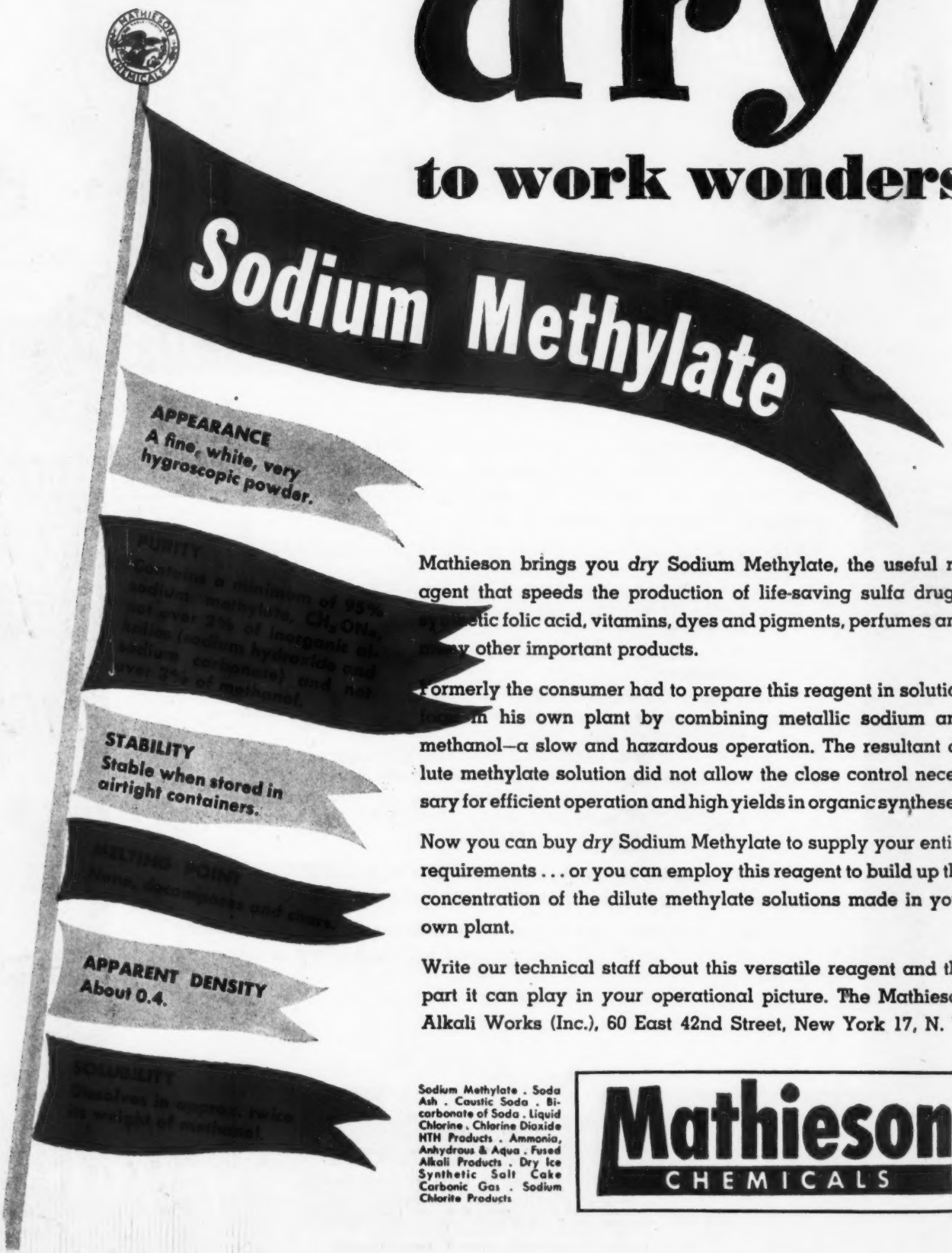

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CHEMICALS

THE CHEMICAL BUSINESS MAGAZINE

Chemical Industries

VOLUME 58
NUMBER 5

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COVER: The resistance of Teflon, Dupont's new tetrafluoroethylene resin, to boiling sulfuric acid is demonstrated by a comparative immersion test. The Teflon is on the right.

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THE READER WRITES

Market Data Booklet

To the Editor of Chemical Industries:

The article entitled "Information Sources for Chemical Market Research" in the December 1945 issue was intensely interesting.

It is noted that it is intended to reprint several articles in booklet form for general sale. I would be pleased to receive information as to when and how this booklet will be available.

W. Cameron Caswell, District Sales Manager
Westvaco Chlorine Products Corp.
405 Lexington Avenue
New York 17, N. Y.

For others who may be interested in the booklet reprint of "Information Sources for Chemical Market Research" we are glad to say that there are yet about ten articles in this series to appear and that the booklet containing the complete set should be ready early in 1947. The price will be announced later this year. Reprints of the individual articles will not be available.—Editor.

Seconds Suggestion On Classification

To the Editor of Chemical Industries:

I am very much interested in Miss Strieby's comment in "The Reader Writes" section of the February issue of Chemical Industries. I feel that an article on "A Classification Scheme for Chemical Market Data" would be very helpful and I trust that you can find someone to do the job.

I wish to take this opportunity to express my appreciation of the series of articles on "Information Sources for Chemical Market Research." These articles have been very helpful to me in my work.

Spencer C. Stanford, Technical Librarian
Monsanto Chemical Co.
Dayton 7, Ohio.

Interlocking Target

To the Editor of Chemical Industries:

I was very interested in reading an abstract in the latest issue of "Time" magazine on the U. S. Strategic Bombing Survey. Of special interest were the estimates of bombing accuracy which indicated that there were only 3.5 per cent hits in a factory area covering 3½ square miles.

Apparently the experts found flaws in the work of Allied engineers—primarily a failure to grasp the significance of the interlocking chemical, oil, rubber, explosives complex which flourishes from a single synthetic route.

I just wonder whether the reason for this failure on the part of our intelligence is due to the fact that they did not have enough qualified chemical engineers on their staffs. While it is true that gasoline alone stilled the German war machine, there is considerable evidence that had synthetic oil, rubber and chemicals been considered as a single target group, the same results would have been achieved more expeditiously.

Robert S. Aries, Research Associate
Polytechnic Institute of Brooklyn
Brooklyn, New York

Carborundum Trade-mark

To the Editor of Chemical Industries:

I have noticed in an article entitled "Infra-red Spectroscopy" by Norman D. Coggeshall published in the February, 1946, issue of Chemical Industries, pp. 256-259, that our trade-mark "Carborundum" has been used as a generic term on page 256, column 2.

I would like to point out that "Carborundum" is the registered trade-mark of The Carborundum Company and is used exclusively by this company as the means of identifying products of our manufacture. We use this mark on our diamond, flint, emery, silicon carbide, aluminum oxide and garnet abrasive products to indicate to the purchaser "made by The Carborundum Company." You will see, therefore, that the word "Carborundum" is not the name of a thing, but is an indication of source.

When Mr. Coggeshall speaks of a "rod of carborundum" the reader has no way of knowing what kind of a rod he is referring to, whether the rod is composed of aluminum oxide, silicon carbide, emery, etc. He is also using our trade-mark incorrectly as he does not mean to refer specifically to products of The Carborundum Company.

W. G. Soley, Patent Attorney
The Carborundum Company
Niagara Falls, N. Y.

Errata

In the article "Boykin Bill Defines War-Lost Patent Rights" by Maurice W. Levy, pages 577-79 in the April, 1946, issue: Line 8 of column 3 on page 577 should read—"If priority rights had not expired . . ." rather than "If priority rights had expired. . ." In line 20 of the same column, "November" should read "September."

Caustic Potash

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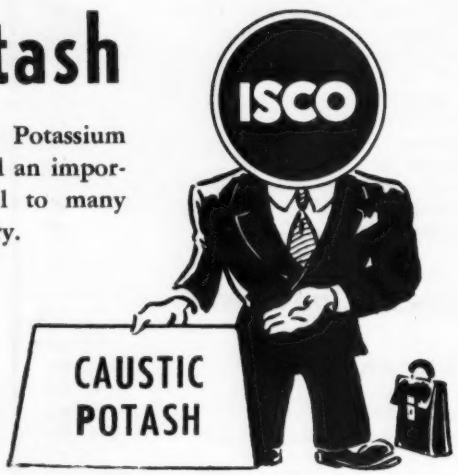

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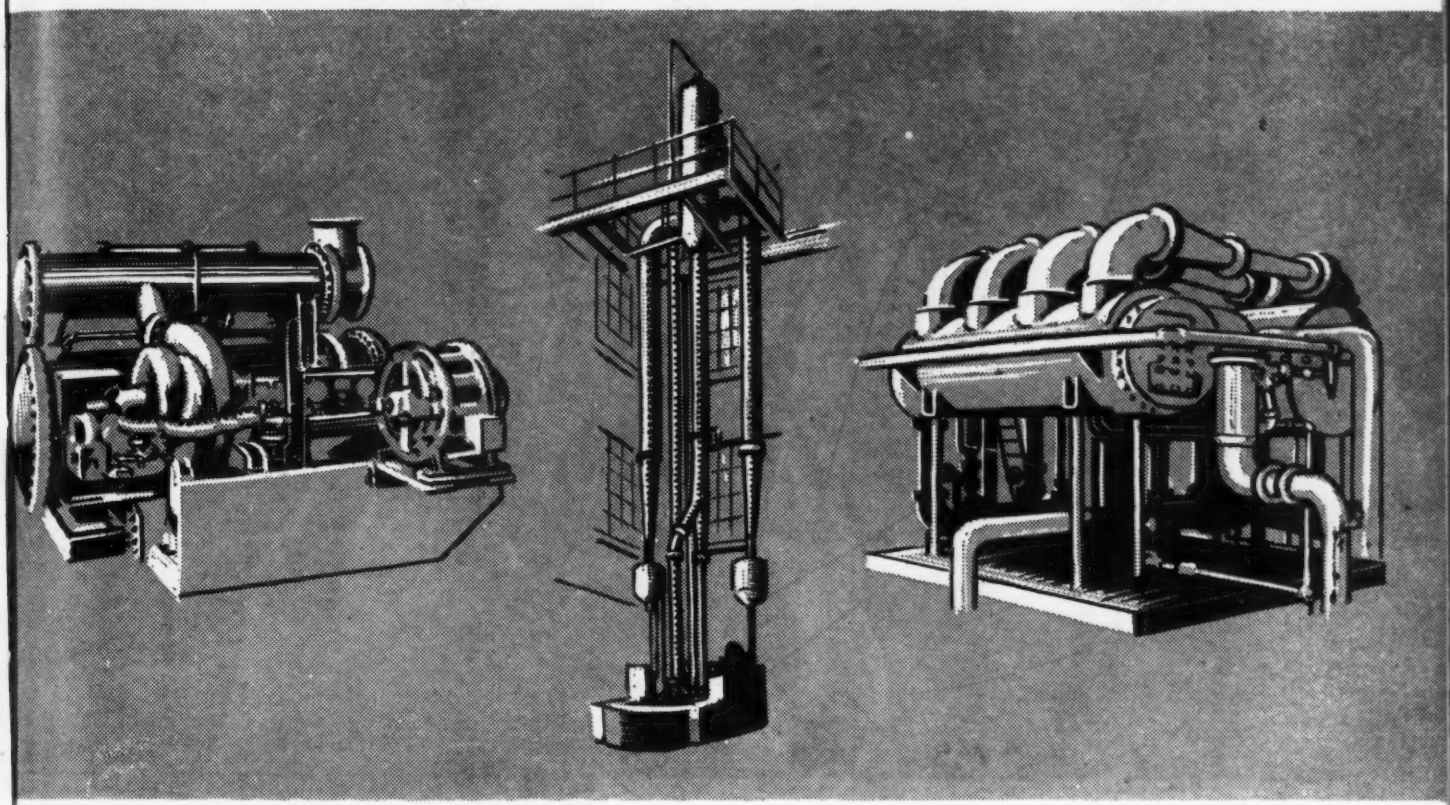

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WASHINGTON

T. N. SANDIFER *reporting*

Federal Research Agency . . . Coal Strike . . . German Chemicals . . . Oil Price Controls Catalog Nazi Data . . . Freon Aviation Use . . . Gelatin Conference

Research Agency Needed, Says Reconversion Director Snyder

ESTABLISHMENT OF A FEDERAL Research Agency is essential and should be the subject of early appropriate legislation, John W. Snyder, Director of Reconversion, stated in his latest production report to Congress.

Such an agency, he said, would coordinate Federal research activities.

"The fruits of research financed by Federal funds must become the property of the United States and should be made fully, freely and publicly available so that American science may be advanced," he stated.

The director also reminded Congress that atomic energy legislation still hangs fire, and urged "early and favorable action" by Congress on the Administration program, which envisions a commission exclusively civilian, to deal with the question.

"It is most urgent that the law shall not stifle pure science nor genuine freedom of independent research," he said, "but it must safeguard military security insofar as necessary."

He recommended early consideration also, of requested funds for extending the work of the Publications Board of the Department of Commerce, engaged in collating and distributing seized German scientific data.

Coal Strike Effects

JANUARY SALES of coal and coke products declined about 12 per cent from December, as a result of the steel strike, and industry men have now expressed concern over the added effects of the coal strike on production of by-products in the industry, especially sulfate ammonia now critically needed in fertilizer production.

A further effect of the coal strike, added to the earlier steel production stoppage will be in containers, though this result may not be felt until some time later.

The over-all effect, it is now anticipated, will be to prolong controls over various critical components and materials, beyond the period such controls would normally terminate.

The situation was complicated by short inventories at most coking plants, and prevailing uncertainty over labor and other factors.

One effect of the coal strike may be to influence conversion of the Government pipe lines to carry natural gas, as an offset to continuous uncertainty in coal supplies for industry and other uses.

Oil industry representatives have renewed their attack on the Surplus Property Administration's adverse recommendation on this point, and have reiterated their opinion that such a conversion of the Government pipe lines would be the least disturbing and most economically desirable use of the system. They also opposed Government operation of the pipe lines.

Meantime, the sale status of the lines was uncertain, with natural gas interests having definitely offered to purchase the lines—which cost an estimated $152,000,000—for $40,000,000. One company, reported to have offered to buy the lines, has also indicated that if this offer is rejected it plans to construct two lines from Texas fields to New Jersey, at a cost of $160,000,000.

Proponents of the gas industries' plans face coal and railroad opposition, however, and the Federal Power Commission is in a position to favor such opposition, through withholding certificates for pipe line construction, if this agency decides to take such a position. There is a suspicion among gas interests that FPC might adopt such a policy.

Many German Chemical Manufactures to Be Banned

THE PLAN for reparations and for establishing the level of postwar German economy has been issued by Allied authorities. Among its salient features the plan eliminates all industrial capital equipment for production of the following: synthetic gasoline and oil; synthetic rubber; synthetic ammonia; primary aluminum, magnesium, beryllium, vanadium; radioactive materials, hydrogen peroxide above 50 per cent strength, specific war chemicals and gases, besides many other products and components.

Facilities for production of synthetic gasoline and oil, synthetic ammonia, and synthetic rubber, among others, will be temporarily retained to meet domestic needs, until the necessary imports are available and can be paid for.

In the basic chemical industries there will be retained 40 per cent of the 1936 production capacity, as gauged by sales in 1936 values, including the following: nitrogen, phosphate, calcium carbide, sulphuric acid, alkalies and chlorine. In addition, to obtain essential fertilizer quantities, the existing capacity for production of nitrogen through the synthetic ammonia process will be retained until the necessary imports are available, and can be paid for.

Of other chemicals, 70 per cent of capacity will be retained, based on 1936, in chemicals for building supplies, consumer goods, industrials, plastics and miscellaneous chemical products. There will be retained 80 per cent of 1936 capacity in pharmaceuticals, and facilities to produce annually 36,000 tons of dyestuffs and 185,000 tons of synthetic fibers.

Production levels for other products are: rubber, 50,000 tons comprising 20,000 from reclaimed and 30,000 tons imported; pulp, paper and printing, 2,129,000 tons, including 400,000 tons for export. Unrestricted will be flat glass, bottle and domestic glass, ceramics, potash. Production of potash is estimated at 100 per cent-plus of the 1938 level.

Oil Price Controls Rapped

SENATOR WRIGHT PATMAN, Texas, has put in the Congressional Record a statement by Texas oil experts that OPA price controls are no longer necessary on oil and petroleum products, due to surpluses of crude in storage and surpluses of gasoline.

The only shortage, the statement contends is in fuel and heating oils, which the statement attributes to faulty OPA pricing policies.

Lead Shortage Acute

THE INCREASING stringency of lead supplies is being reflected in orders affecting high-octane gasoline production, as well as many other chemical manufactures.

Gasoline will be limited to 80-octane rating for motor use, and 100-octane for aviation gasoline—except on special authorization—and industry men privately expressed the view recently that very lit-

tle of the high-octane motor fuel would be made, even though some lead might be allocated for the purpose. The expectation is rather, that lead supplies in the industry will be spread very thin, to provide quantity rather than quality.

U. S. Cataloguing Nazi Trade Secrets

AMERICAN INDUSTRIAL and scientific groups have been asked by the Department of Commerce Publications Board to assist in determining what German trade and industry data is vital, and of use to industry on this side.

An open letter from the agency asks for technical workers to aid in sifting literally tons of documents, reports, plant data, and descriptions of German industry processes, recovered by American technical teams abroad.

"We want industries and scientific groups to name experts to suggest specific information that should be sought," the agency said. "We want suggestions as to where in Germany valuable documents may be found, and what industries in Germany may possess information not now available."

Among the fields in which experts are needed are chemicals, fuels and lubricants, textiles, metals and minerals.

Included in a recent list of German secret processes and data uncovered are 19 major German developments in plastics, new methods of recording textile wear, details of successful German research in production of saccharine without use of toluene or permanganate of potash, and discoveries in acetylene chemistry and recoil fluids for cold weather use.

Freon Gas Used in Aviation Research

INCLUDED IN PROJECTED additional research facilities of the National Advisory Council for Aeronautics, temporarily headed by Jerome Hunsaker, of M. I. T., are modifications of a two-dimensional pressure tunnel to use Freon gas as the test medium in determining pressure resistance. Its high density and low rate of pressure propagation permits the attaining of high values of Reynolds and Mach numbers at lower speeds than are possible in air.

It is also planned to develop jet fuel research facilities at the Cleveland laboratory, in recognition of the place this modern high-speed development has in postwar aviation.

Dr. Hunsaker has given Congress a rather significant picture of foreign research, with which our scientists are now in competition; the English, he recalled, had a full view of our laboratory developments during the war, and are now engaged in a $100,000,000 program of their own, devoted to aeronautical exploration, including fuels and other matters; the Russians are believed to be putting great emphasis on science and research in all fields, while a large proportion of the German engineers and scientists who were back of the extraordinary German research accomplishments in the war, are now in employ of British and other Governments.

In this connection, and in reference to the recommendations for national science legislation, there is pending legislation for a National Research Foundation, and a National Science Foundation, but the authoritative opinion has been expressed that no existing Government agency would be absorbed under either the Kilgore or Magnuson proposals.

One of the interesting sidelights on this matter is a request by Dr. Hunsaker for an amount up to $10,000 which would be available for hiring on a per diem basis, technical and scientific consultants from private industry and institutions.

It is also planned to increase the printing of captured German scientific documents, especially those which were held up in the secret Army and Navy files until the end of the war. There are over 2,900 reports on research conducted by or with cooperation of the NACA, which have not been recorded in the form of permanent technical reports. The understanding is, in fact, that only about 170 are now to be printed, under existing authorizations.

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World Conference on Gelatine

THERE MAY BE a substantial increase in the quantity of materials needed by this country for manufacture of gelatine, glue and fertilizers, as a result of agreements reached in mid-April at the London conference, attended by various national representatives, including those from Civilian Production Administration.

"If the recommendations concurred in at this meeting can be put into effect, it will mean a substantial increase in these materials in the United States," Wells Martin, of the CPA Chemical Division, reported later.

Sale of Surplus U. S. Properties in Canada

UNDER AN AGREEMENT recently approved, the United States has sold to Canada for $12,000,000, surplus equipment and supplies located in Canada incident to the U. S. war effort. Among the properties disposed of were the Standard Oil office building and housing area at Edmonton, for $4,706,841; petroleum products, $1,250,000.

Petroleum Reserves Under Farmer Study

THE TIDE-LAND petroleum reserve controversy has been brought before farmer cooperative groups by interested government agencies, in what appears to be an oblique bid for support from this quarter in the agencies' battle to control such reserves through court action.

New and interesting opportunities for organic synthesis and product improvement have been made possible by Niagara through the introduction of a fully chlorinated tetra chloro phthalic anhydride. This remarkably versatile chemical, for which Niagara has developed a special manufacturing process, possesses unique properties that can be put to practical advantage in the processing of dyes, esters, synthetic rubbers, pharmaceuticals, insulating materials, fungicides, protective coatings, lubricants, synthetic resins. Our research laboratories and technical staff are prepared to help you find ways to use this chemical formula practically and profitably.

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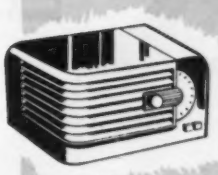

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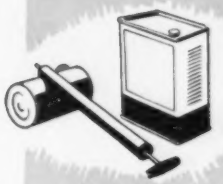


DIACETONE

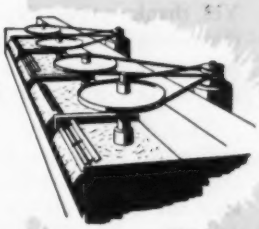
High boiling solvent. Functions both as an alcohol and a ketone. Mild odor makes Diacetone especially suitable for interior brushing lacquers — nitrocellulose and cellulose acetate types. Component of hydraulic brake fluids.

ISOPROPYL *(Refined)*

New high standard of purity increases the value of Isopropyl for formulation of hair tonics, shampoos, massage preparations, lotions, liquid soaps, emulsions, astringents and antiseptics. Likewise valuable in preparation of vitamins, biologicals and drugs.

METHYL ISOBUTYL CARBINOL

Moderate evaporation rate makes this alcohol a desirable latent solvent for nitrocellulose lacquers; resin solvent for phenolic type baking finishes . . . alcohol portion of a solvent for synthetic alkyd and urea-formaldehyde baking finishes. In combination with other materials, used as a frother in the flotation recovery of certain copper and zinc ores.



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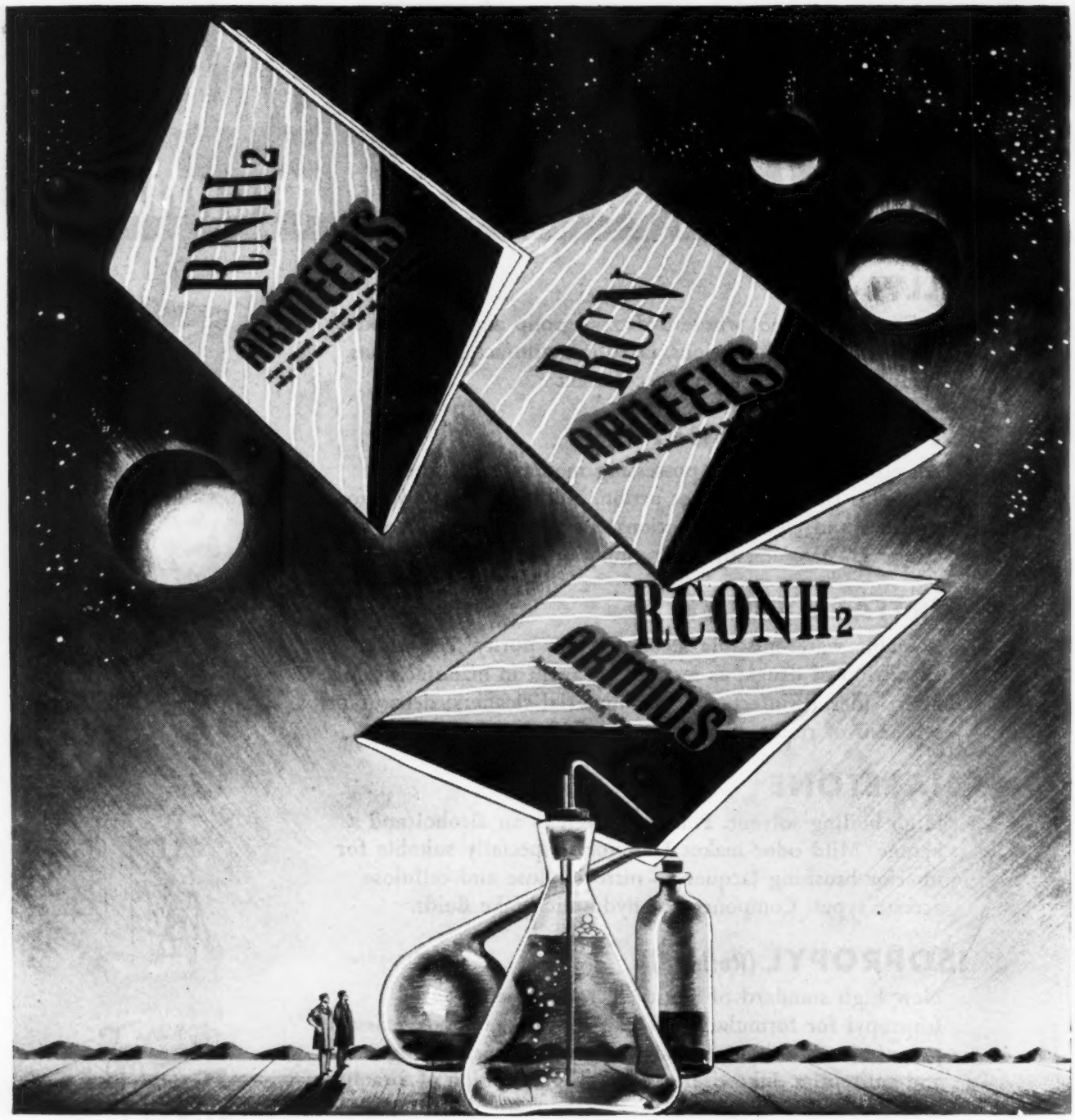

THE "CD" CHEMICALS HAVE COME OF AGE...

Yes, thanks to ever-expanding research, these chemicals which a few years ago were only laboratory curiosities are today available in commercial quantities for industrial use.

Though discovery of their full fields of utility still lies in the research laboratories of creative chemists, these high molecular weight aliphatic chemicals are widely used with excellent results in such diverse applications as FLOTATION REAGENTS FOR OXIDIZED ACIDIC MINERALS . . . DISPERSING and COAGULATING AGENTS . . . PLASTICIZING and LUBRICATING SYNTHETIC RUBBER . . . CATIONIC EMULSIONS . . . ANTI-TACKING VINYL and ETHYL CELLULOSE RESINS . . . STABILIZING HYDROCARBONS . . . IMPROVING ADHESION OF ASPHALT TO AGGREGATE . . . WATERPROOFING . . . RUST-PROOFING . . . GREASEPROOFING . . . GERMICIDES, FUNGICIDES, INSECTICIDES.

Three new brochures have been prepared on these ARMOUR chemicals: ARMIDS, $RCONH_2$, high-melting organic chemicals . . . ARNEELS, RCN, organic cyanides from fats . . . ARMEENS, RNH_2, organic alkalis from fats (and ARMACS, their acetate salts).

Your copies will be mailed upon request.

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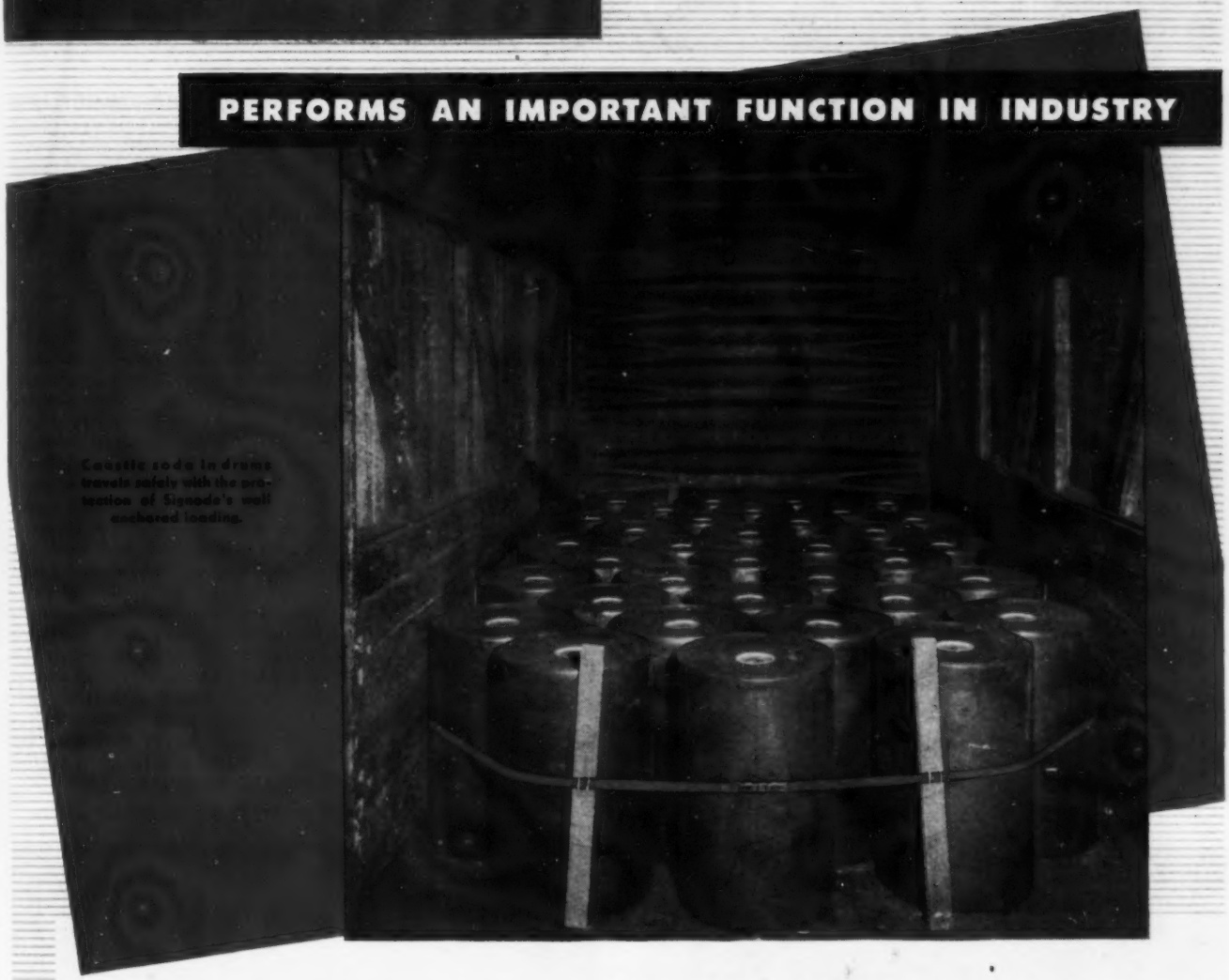
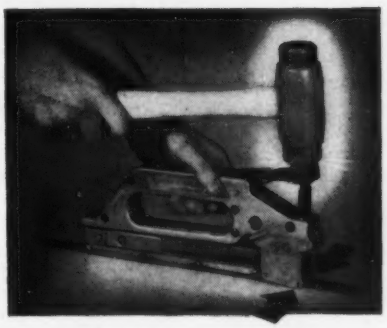


Caustic soda in drums travels safely with the protection of Signode's wall anchored loading.



E-Z DRIVE Strap Stapler. Magazine feed for fast stapling. Drives ¾" x ⅝" standard 14. ga. staples.

● Even chemicals in bulk can be shipped in greater safety with Signode's PLANNED PROTECTION. Damage in transit is reduced to a minimum. Signode Methods provide top security and economy for all shipments—in drums, pails, bags, cartons or bulk. Undamaged arrival is more essential now than ever before.

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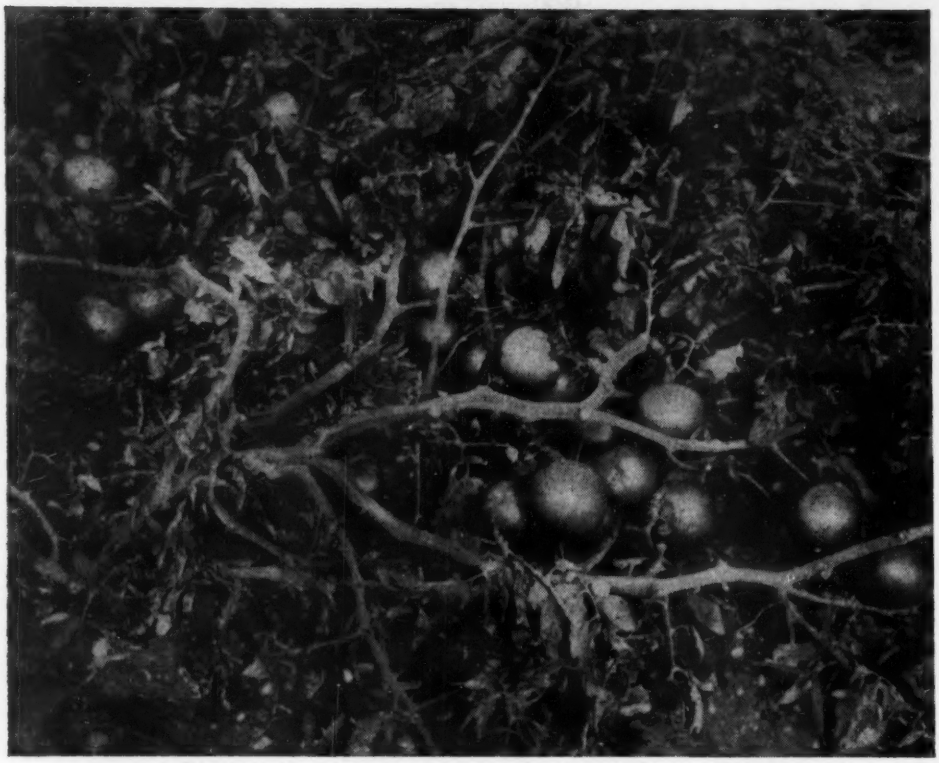
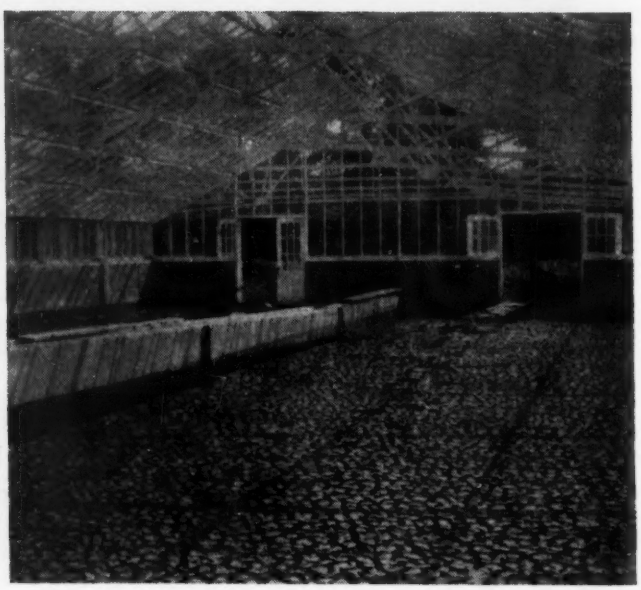


(*Left*) **DEFOLIATION OF TOMATO PLANTS** continues to solve many problems for the tomato grower and canner. Throughout the northern United States and in areas on the west coast, it is quite common for growers to lose a large percentage of the fruit already produced on the plants because it does not ripen before frost. With declining temperatures and decreasing hours of intense sunlight in early fall days, the fruit on plants with heavy foliage does not take on, rapidly enough, the full red-ripe color so necessary for high quality. If left in the field long enough for this color to develop, the fruit is often lost through frost. It has been found, however, that defoliation of the tomato plants with Cyanamid's AERO DEFOLIANT** exposes the fruit to direct sunlight for full, red ripening and easy picking. Yields in late pickings have been increased as much as forty per cent, and increased speed of picking often means the difference between getting a crop picked or leaving it in the field. Cyanamid's AERO DEFOLIANT has also proved highly successful for the chemical defoliation of cotton and soybean plants.



(*Above*) **IN SEWAGE TREATMENT,** Cyanamid's Sulphate of Alumina has been found to be an economical coagulant of established effectiveness. In the settling process (left), Sulphate of Alumina coagulates over a wide pH range to form a high adsorptive floc which settles readily, yielding a sparkling effluent, low in B.O.D. and suspended solids. When used for sludge conditioning (right), it promotes rapid drying of the sludge on the sand beds. This eliminates ponding and inhibits odors. Rapid drying greatly increases the capacity of sludge beds and reduced volume of cake lessens cost of removal. Cyanamid's quality Sulphate of Alumina has many other properties of benefit to operators of sewage treatment plants. It is clean and easy to handle. Additional advantages are that it is free flowing, remains so, and does not clog the dry feed machine nor corrode feeding equipment.

CHEMICAL NEWSFRONT

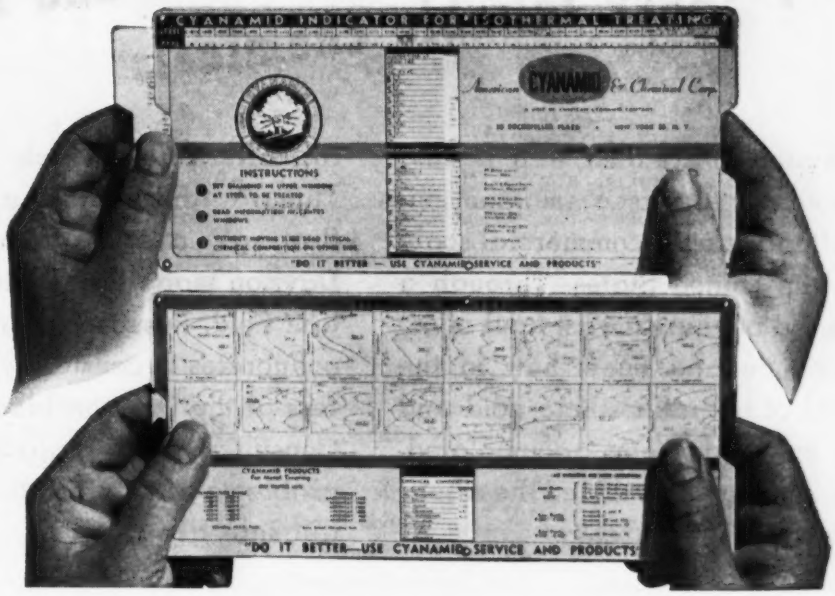
(Left) **THIS REMINGTON ELECTRIC RAZOR HOUSING** is made of a new BEETLE* plastic molding compound, especially developed by the Plastics Division of Cyanamid for product housings. The material has two important advantages over other plastic housing molding compounds . . . improved dimensional stability and reduced aging shrinkage. The increased dimensional stability provides a safeguard against stresses which may affect internal moving parts of electrical mechanisms such as those in the tiny motor of a razor.

BEETLE housings are handsome, as well as practical. They have all the basic requirements needed for powerful sales appeal, customer satisfaction, product efficiency, and economical production. The new BEETLE plastic imparts lasting usefulness, color, and beauty to housings. Its hard surface can stand repeated handling without showing wear or abrasion. It is smooth and lustrous, pleasant to the touch. Complete information on BEETLE plastics for other uses such as for buttons, clock cases and radio cabinets, jewelry boxes, cosmetic containers and closures, tableware, lighting reflectors and fixtures, and instrument parts, is available from the Plastics Division.

(Right) **A TIMELY AID FOR THE HEAT TREATER!** A pocket "slide rule" calculator has been prepared by Cyanamid for the ready determination of S or TTT Curves for thirty-five widely used steels. (Photograph one-third actual size.) This convenient indicator for isothermal heat treating is the first of its kind ever to be published. It is designed to save hours of time for anyone engaged in the heat treating of metal. The thirty-five steels included cover the principal formulations most commonly used in the metal working industry.

The calculator is available free upon request. Also, a copy of a comprehensive, up-to-date technical bulletin supplying bibliography on isothermal heat treating and index of S and TTT Curves for 187 different steels will be sent on request. It covers the uses of Cyanamid's complete range of salt bath products for case hardening, liquid carburizing, annealing, hardening, and quenching.

*Reg. U. S. Pat. Off. **Trade-mark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INSTRUCTIONS
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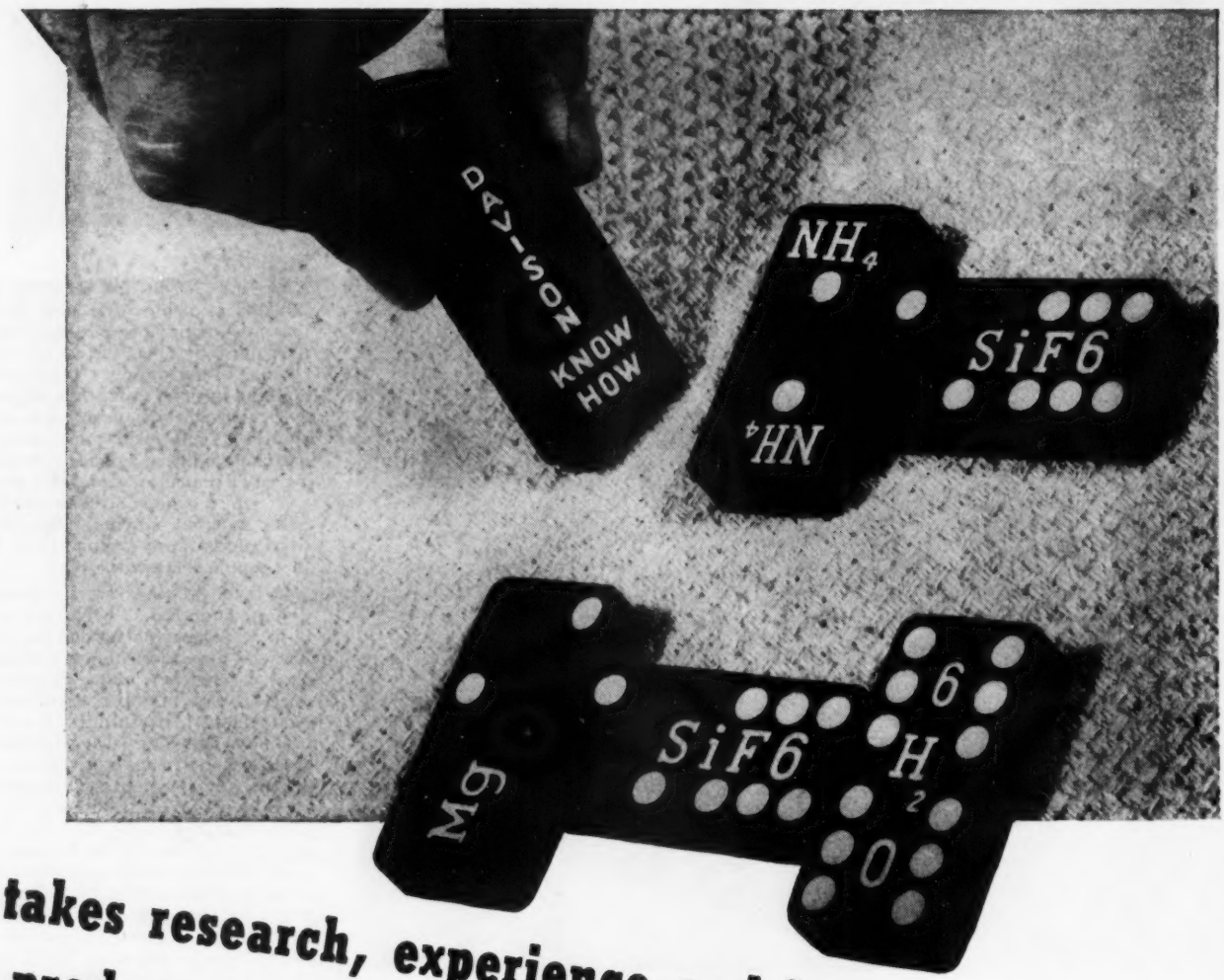

It takes research, experience and know how to produce reliable chemicals

Davison is credited with having produced the first ammonium silicofluoride on a commercial scale in the United States. Through a period of years a vast fund of experience and know how in the field of hydrofluosilicic acid and its salts has been accumulated. To this has been added the results of modern research.

Silicofluorides which will not "lump" and which are "free flowing" are an example of Davison leadership in this important field. Research work on silicofluorides is constantly in progress at the Davison laboratories. Consult Davison regarding your problems involving the silicofluoride group.

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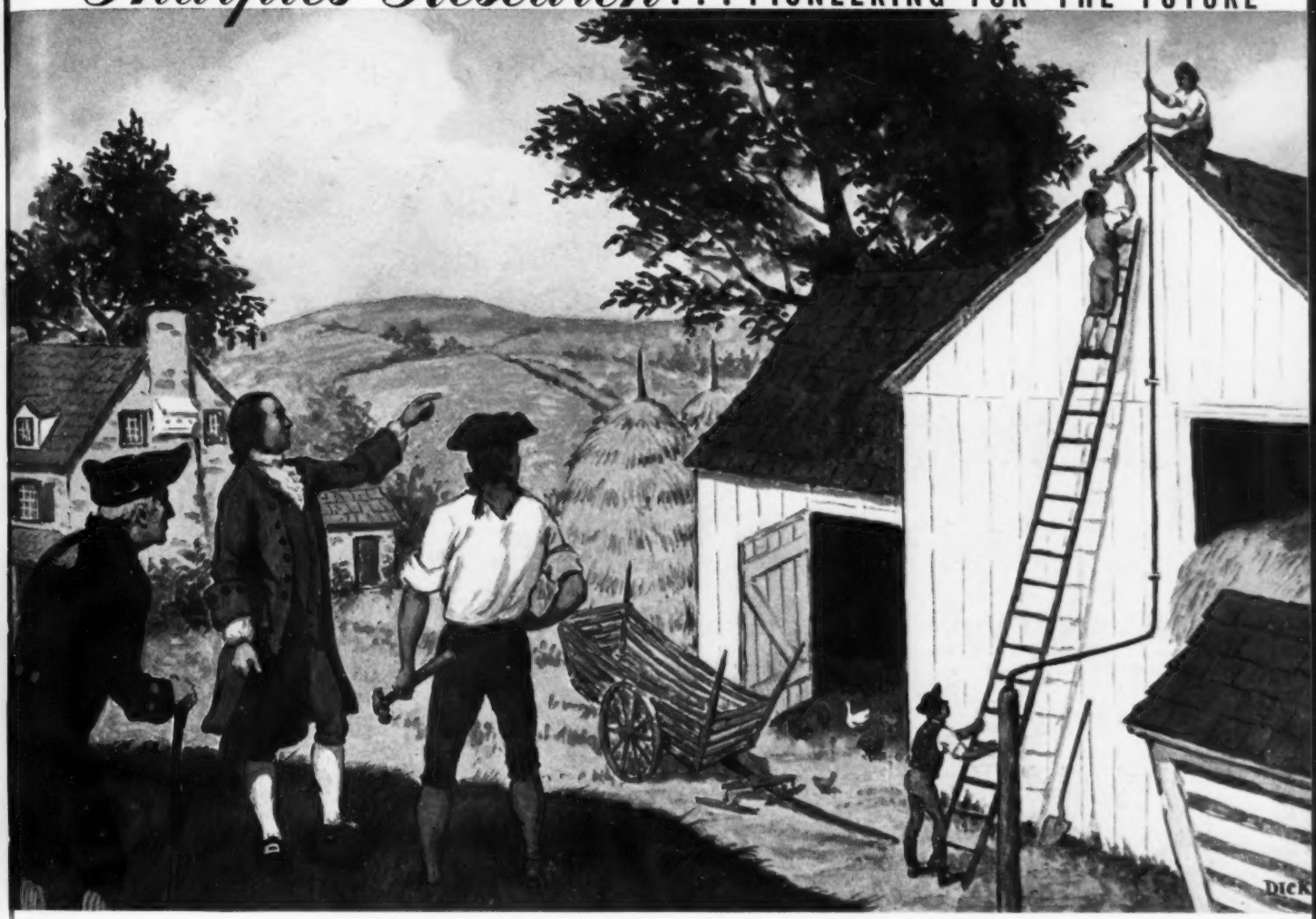

One of the results of Benjamin Franklin's experiments with electricity was the lightning rod, produced in 1752—a boon to farmers, whose barns were especially vulnerable.

SHARPLES' new corrosion inhibitors, like Franklin's lightning rod, were developed to control destructive forces. Inhibitors 1143 and 1148 are effective corrosion inhibitors and are available in technical grades, properties of which are given below. They are suitable for use under either acid or neutral conditions, but should not be used in caustic solutions.

In contrast to many inhibitors which are crude mixtures of variable composition, Sharples Inhibitors are chemical entities of uniform composition.

The following applications are of special interest: Inhibitor 1143: pickling with sulfuric acid; pickling of cast iron with hydrochloric acid; reduction in brine corrosion of ferrous metals and aluminum alloys.

Inhibitor 1148: pickling of carbon steel with hydrochloric acid.

These inhibitors have been tested for only a relatively few specific applications. They are recommended for investigation as the possible solution to your corrosion problem. Samples and further information are available on request.

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Corrosion Inhibitor	Color	Odor	Melting Point ° C.	Boiling Point ° C.	Solubility at Room Temperature		
					Aqueous Media	Hydrocarbon Oils	Vegetable Oils
1143	Buff	Faint	59-63	Decomposes	0.02-0.06%	Approx. 0.4%	Over 2%
1148	Buff	Faint	72-76	Decomposes	Approx. 3%	Approx. 0.05%	Approx. 0.1%

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TRIAMYLAMINE TRIETHYLAMINE TRIBUTYLAMINE
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ETHYLETHANOLAMINE
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Filtration, especially of corrosive slurries, is one of the most difficult of the unit processes for which to choose equipment. Filtration apparatus should be designed with two main considerations in mind: chemical resistance to the slurry handled and simplicity of operation.

General Ceramics vacuum and pressure filters, satisfy both of these requirements. They are fabricated of chemical stoneware, a material which is not only corrosion resistant but *corrosion proof* with all acids except hydrofluoric. Their construction is simple, with no moving parts to corrode and cause breakdown.

The vacuum filter consists of two chambers, set one on top of the other and separated by a medial plate which acts as a support for the filtration medium. By applying vacuum to the bottom section the filtrate is forced through the medium leaving the filter cake in the top section. General Ceramics vacuum filters are made in various styles with integral plates, separate plates, and other modifications that may be called for by any particular filtration operation. These filters are available in capacities ranging from one gallon to one hundred gallons per section.

The pressure filter is made up of two hemispherical sections with pipe connections at the apex and with a supporting plate for the medium clamped between each section. Liquid is pumped through the two sections, the solids remaining on the medium. This equipment is suitable for operation at pressures up to 30 psig.

If your filtration problems are slowing up your plant production, send for BULLETIN 171. It gives all necessary details for installation and operation of this equipment.

A General Ceramics engineer with experience in the filtration of corrosive slurries will be glad to discuss this subject with you. A letter to our main office or to one of our branch offices will bring you complete information.

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In addition to the manufacturing facilities of the Chemical Equipment Division those of the Insulator Division are also available for handling ceramic problems in all branches of industry. General Ceramics & Steatite Corporation is therefore able to offer service covering all industrial applications of ceramic products.

New Mine and New Excavating Equipment to Increase Production of Higher-Grade Phosphate

• The bucket of the new dragline has a capacity of 21.4 cubic yards, so large it can hold a full size automobile.

• World-wide requirements for food are expected to increase the demand for phosphates to a new high level in the United States, Europe and the Far East. To increase production to meet this demand International is expanding its sources of raw material and adding new mining equipment.

International has recently purchased a 2,000-acre property at Bartow, Florida, containing large deposits of higher grade ore which will be developed into the largest phosphate mining operation in America. It will be completely mechanized for efficient, low cost operation and will have a life of twenty-five years.

At its Peace Valley Phosphate Mine, International has recently placed in operation the largest dragline excavator ever used in the industry. It will greatly increase the output of phosphate and achieve far more efficient and economical production. Another unit has been ordered for the new operation at Bartow.

Since 1909, International's mining operations have kept pace with the growing world-wide need for phosphates as a result of its research and development of new processes to increase production, improve the product and reduce costs. Today, with its huge resources of high-grade ore and its mining facilities, International is well prepared to supply expanding domestic and foreign markets with phosphates for both agricultural and industrial purposes. International Minerals & Chemical Corporation, General Offices: 20 North Wacker Drive, Chicago 6.

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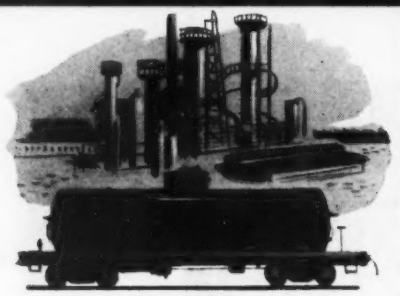

ALCOHOL

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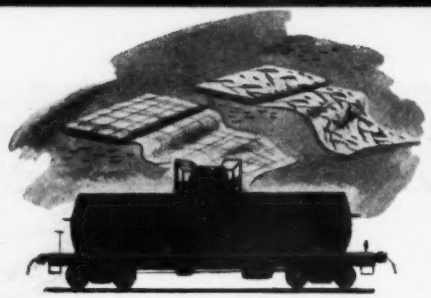

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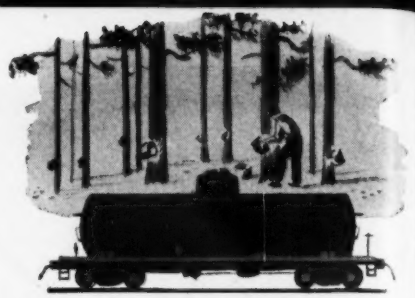

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Clean steel car; 6,000 to 8,000 gallon capacity.

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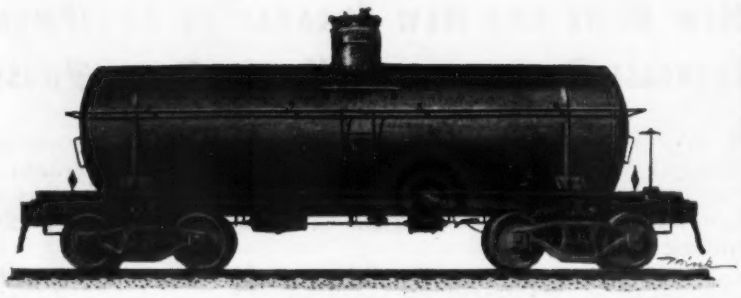

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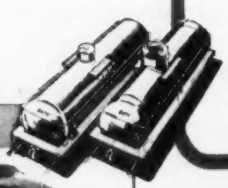
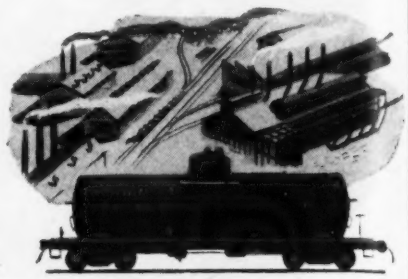
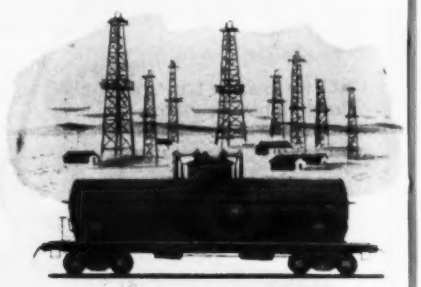


GENERAL AMERICAN TRANSPORTATION CORPORATION CHICAGO



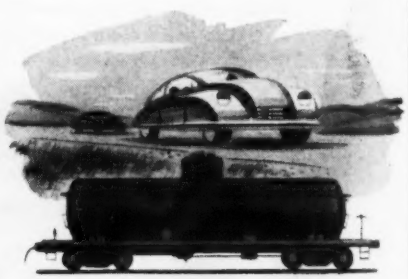
FUEL OIL

Steel car, steam coiled, 8,000 to 12,500 gallon capacity.



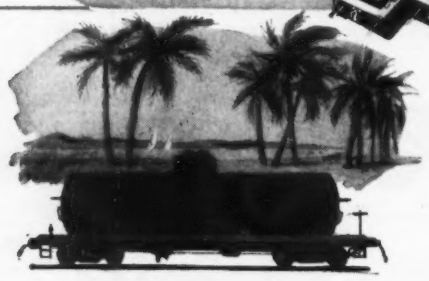
MURIATIC ACID

Car lined with pure or synthetic rubber; 8,000 to 10,000 gallon capacity.



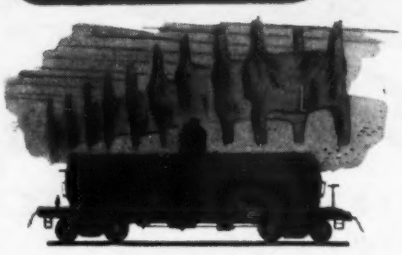
GASOLINE

Clean car, 6,000 to 12,500 gallons; single or multiple compartment



COCONUT OIL

Clean steel car, with steam coils, usually 8,000 gallon capacity.

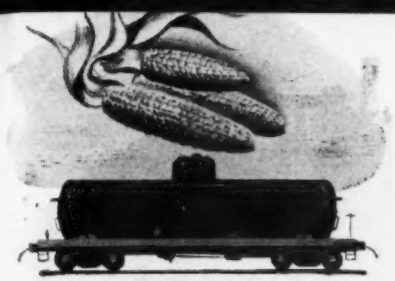


TANNIC ACID

Equipped with brass coils and interior lined with a resinous, plastic or asphaltic material.

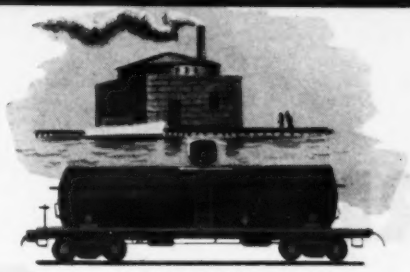
MOLASSES

Steam coiled car with heavy capacity trucks; 8,000 gallon capacity.



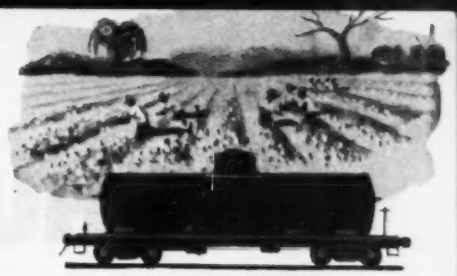
CORN OIL

Clean, steam coiled car.



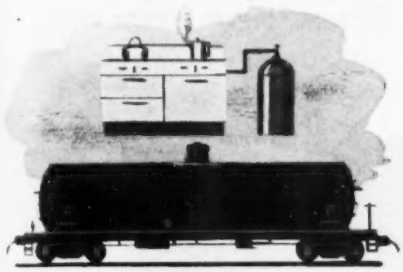
CHLORINE

Insulated, welded car; built to withstand pressure up to 500 pounds; 15 or 30 ton capacity.



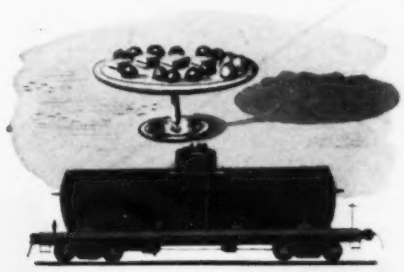
COTTONSEED OIL

Clean, steam coiled car of 8,000 gallon capacity.



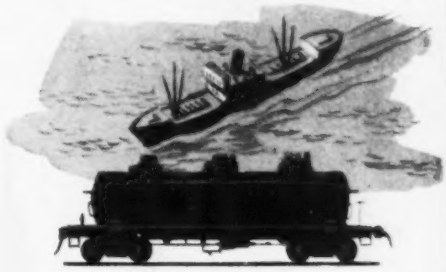
PROPANE

Heavily constructed car, welded and insulated. Built to withstand internal pressures to 300 pounds. Capacity 10,000 to 11,000 gallons.



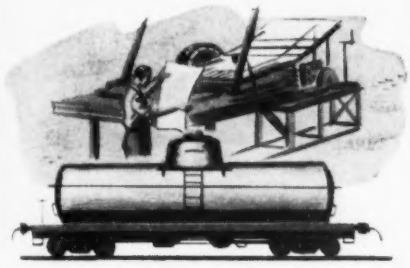
GLUCOSE

Clean, steam coiled with heavy truck capacity. Usually lined with aluminum paint.



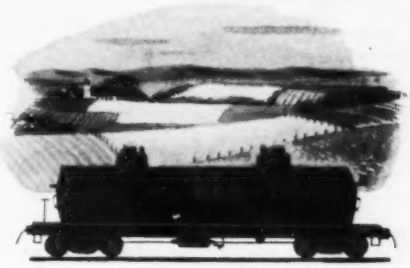
LUBRICATING OIL

Steel car, with steam coils, single or multiple compartment; usually 8,000 gallon capacity.



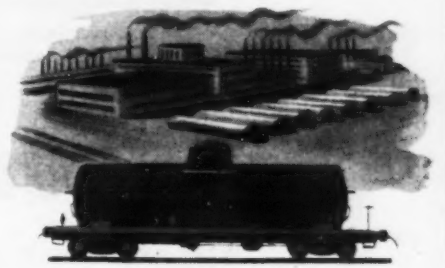
ACETIC ACID

Aluminum Car, 8,000 or 10,000 gallon capacity.



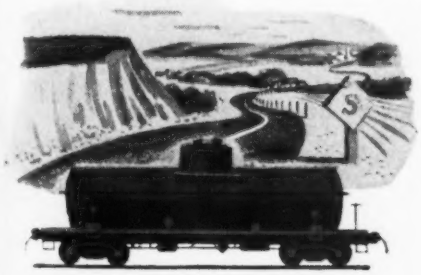
LINSEED OIL

Steel car equipped with steam coils; single or multiple compartment, usually 8,000 gallon capacity.



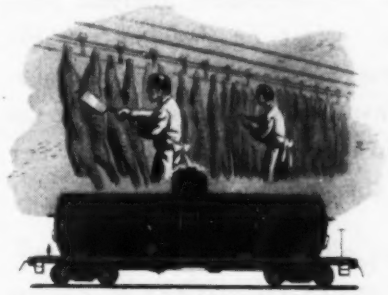
BENZOL

Clean car, with steam coils; 8,000 to 12,500 gallon capacity.



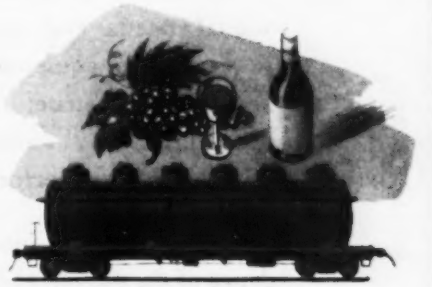
ASPHALT OR TAR

Heavily steam coiled car; with 2 or more inches of insulation; steam jacketed outlet; 8,000 to 10,000 gallon capacity.



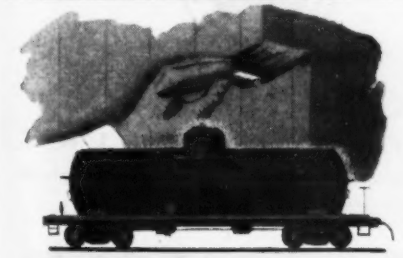
LARD

Clean steam coiled car, usually of 8,000 gallon capacity



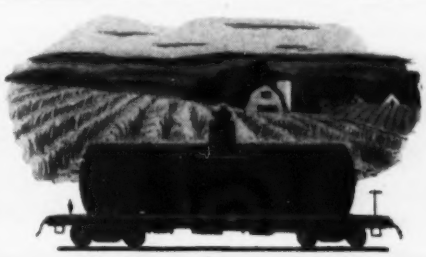
WINE

Insulated car with one to six compartments. Interior coated to preserve quality.



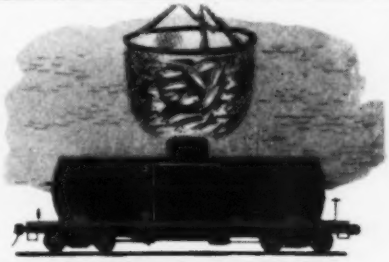
TUNG OIL

Steam coiled steel car, usually of 8,000 gallon capacity.



SULPHURIC ACID

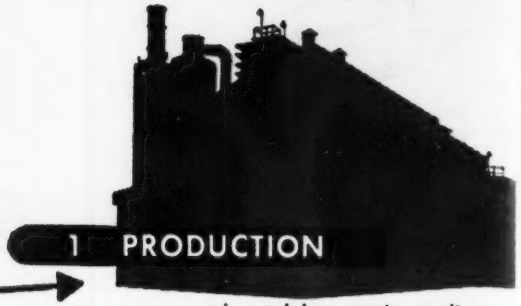
Heavily constructed steel car with heavy truck capacity. Equipped to unload through dome.



FISH OIL

Steel car with steam coils.

FOR SULPHURIC ACID . . .



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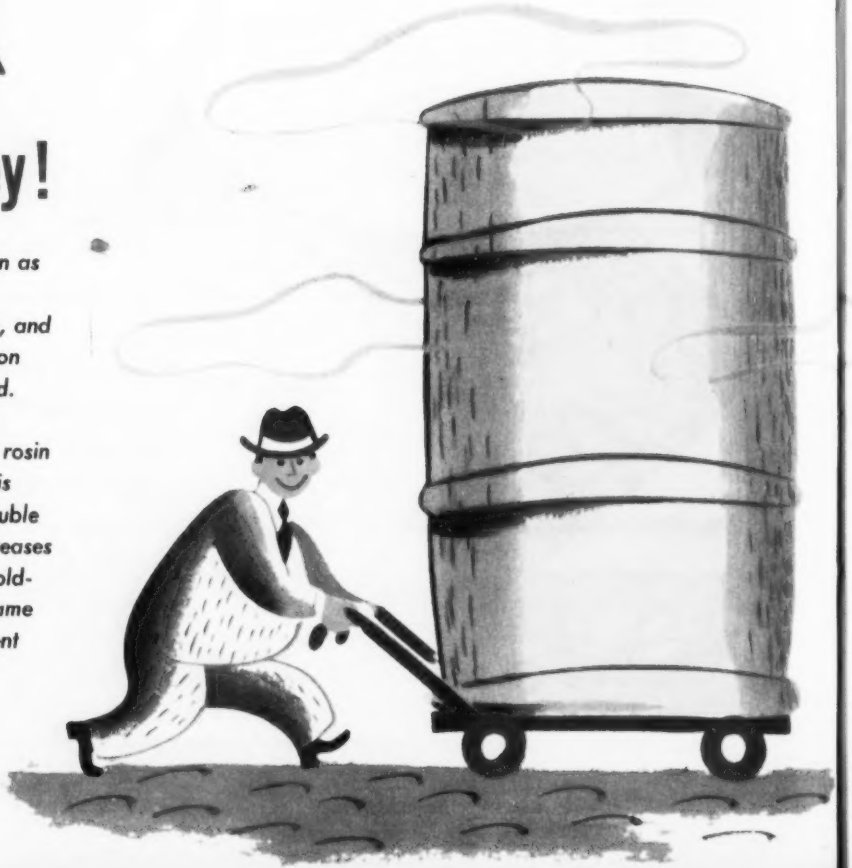
See next page

Body-Builder that Won't Wash Out!

Water can't take the starch out of this muscle-man's shirt! New emulsions made with Hercules Ethyl Cellulose provide lasting, yet economical, textile sizes that resist washing out or dusting out. Used like starch, these water-thinned emulsions give body to shirtings, sheetings, curtains, marquisettes, for example. After fabrics are laundered, the handle is effectively restored on ironing. Return coupon on Page 4 for technical details on Hercules Ethyl Cellulose, or the names of manufacturers who can supply these emulsions ready for use.

More for Your Money!

Here's a barrel of value in lacquer resin! Known as Cellolyn 102, this new Hercules resin offers advantages over hard, rosin-modified maleates, and is suitable for practically any lacquer formulation where these maleates have been previously used. Yet it is appreciably lower in cost, and readily available! Cellolyn 102 is superior to the usual rosin maleates in compatibility with nitrocellulose. It is equal in color, rapid solvent release, and is soluble in a wide range of solvents. It appreciably increases low temperature flexibility, as determined by cold-check tests, affords better sanding within the same range of cold-check resistance, and has excellent resistance to printing. For further details, return coupon on Page 4.



Run-Proof Resin Emulsions!

Hercules CMC (carboxymethylcellulose) can help to make painting easier, less messy, for housewife and professional alike! CMC acts as a stabilizer in resin emulsion paints, decreasing the tendency toward excessive running, dripping, and brush splatter during application—yet retaining a good "wet edge" for easier brushing. Furnished as a white, granular, odorless powder, Hercules CMC serves as a stabilizer or binder for many diversified products, ranging from protective coatings to crayons and adhesives. Other applications are now under investigation in the food, pharmaceutical, and cosmetic fields. Return coupon on Page 4 for technical data.

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A faster heat-cure for synthetic rubber tires, without endangering their physical well-being, soon may be possible—according to extensive tests made recently at the Hercules rubber testing laboratory! These tests show conclusively that by using litharge with Hercules stabilized rosin softeners in the milling of GR-S and GR-S-10, the curing time for these compounds may be accelerated considerably over that for similar unleaded compounds. Yet, resistance to heat embrittlement is increased, and the tendency toward scorchiness is markedly reduced. If you compound synthetic rubber, the results of these tests may be extremely helpful to you. Return coupon on Page 4 for your copy.

Read All About It!

Get the latest information on the properties and uses of Hercules Terpenes! This book contains twelve pages of descriptive material, analytical data, and charts on Terpene Hydrocarbons (Pinene III, Steam-distilled Wood Turpentine, Dipentene 122, Solvenol* 1, para-Cymene), Pine Oils and Terpene Alcohols (Yarmor* 302 Pine Oil, B-3 Reagent, alpha-Terpineol, Terpineol Extra, Terpin Hydrate), and related materials (Hercosol* 80, Terposols* 3 and 8, Anethole, Thanite*). Send for your copy today by mailing the coupon below.*

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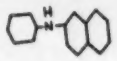

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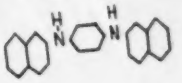

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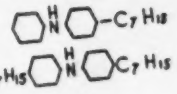
Purity 98%



Mixed Mono-and Diheptyl Diphenyl Amines

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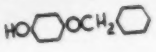
(3.0 mm)
Purity 98%



Monobenzyl Ether of Hydroquinone

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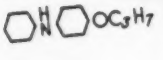
Purity 90%



Isopropoxy Diphenyl Amine

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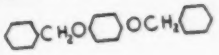
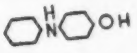
M. P. 78°
Purity 92% min.



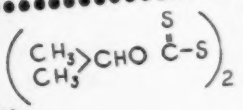
Dibenzyl Ether of Hydroquinone

Available in Pilot Plant quantities
M. P. 119°
Purity 85%



p Hydroxy Diphenyl Amine

Available in commercial quantities
M. P. 150
Purity 92%



Di Isopropyl Dixanthogen

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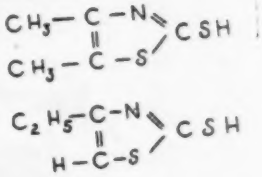

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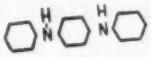

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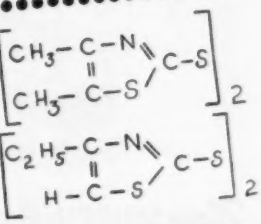

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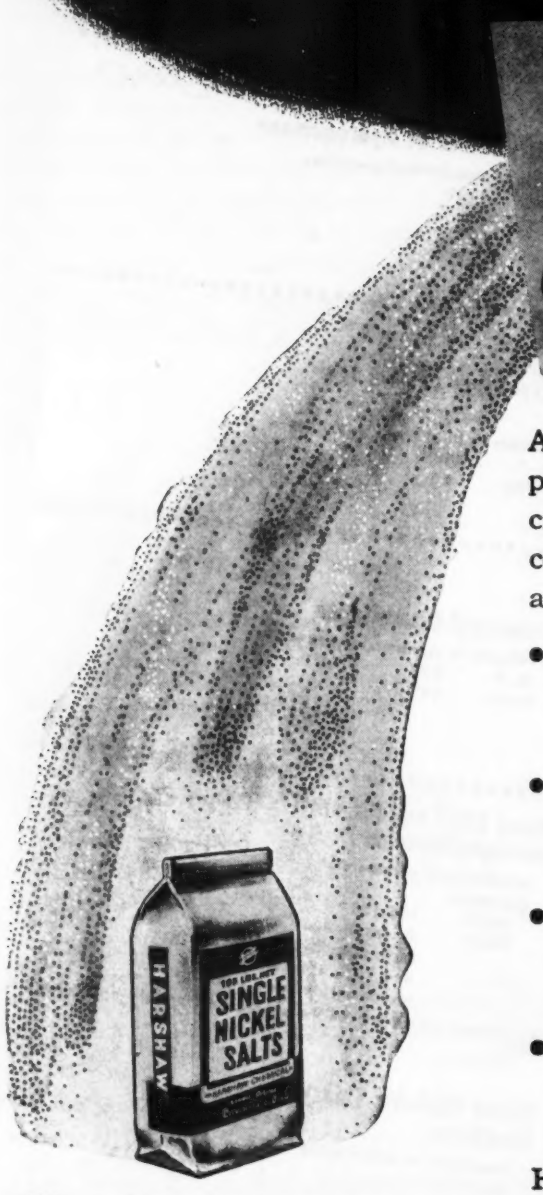
NOT A POWDER

This photograph, at ten times magnification, shows the uniformity of crystal size.

A unique process, developed by Harshaw, now makes it possible to produce single nickel salts as small definite crystals of carefully controlled size. Advantages, when compared with the larger crystals formerly produced, are numerous.

- **Uniformly Small Crystals . . . Not a Powder**—Harshaw's unique manufacturing process controls the uniformity of crystal size and shape.
- **High Purity . . . High Nickel Content**—These uniformly small $NiSO_4$-$6H_2O$ crystals are the purest, highest nickel content nickel salts we have ever made.
- **Rapid Solubility**—Small crystals provide a large surface area. Solubility is rapid, saving time and trouble in preparing solutions.
- **Free Flowing**—When kept under reasonable storage conditions, these salts remain free flowing—lumping and caking are eliminated.

Harshaw is ready to help you with this new development for better work. Order now from your nearest Harshaw branch.



***New* SHIPPING PACKAGE**

This new type of nickel salts now makes possible the use of strong 5-ply paper bags containing 100 lbs. net. Easy to handle—they stack conveniently and pour in a free flowing stream.

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THE HARSHAW CHEMICAL CO.
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Tailor to Kings of industry, KELCO ALGIN serves rulers among products in many fields. It is an important ingredient in such widely varied products as: TEXTILE PRINTING PASTES . . . LATEX ADHESIVE MIXTURES . . . PAPER SIZING . . . BOILER WATER COMPOUNDS . . . COLD WATER PAINTS . . . INDUSTRIAL HAND LOTIONS . . . TOOTH PASTES AND OTHER PHARMACEUTICALS . . . FOOD PRODUCTS.

Only a very small quantity of KELCO ALGIN is required to produce the results for which it is intended. KELCO ALGIN'S functions vary from thickener, emulsifier or stabilizer, to suspending, gel-producing or film-forming agent. This ultra-refined natural algin product is processed to exact specifications—according to the specific purposes for which intended. It never varies in characteristics or results produced.

Our technical staff is prepared to work in closest cooperation with you . . . in adapting KELCO algin to your particular requirements. Write or wire for immediate consultation.

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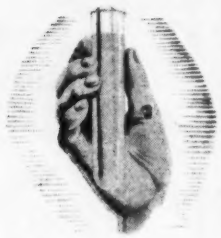

What kind of noise Does Research Make?

Research used to be a quiet thing — one of those taken-for-granted operations upon which the world depended for new developments, never quite realizing how or why.

Today, research makes more noise. It echoes in the concussion that blasted two cities off the face of the earth. It is reflected in a queue of people, blocks long, waiting to buy nylons. It is the difference between life and death when heretofore-incurable diseases set in. It is high-octane gasoline, modern plastics, electronics. It is the future of industry and the world.

Research has reached the point where, to quote a giant industrialist, ". . . our scientific and technological development has so far outdistanced our social engineering, that we have no choice but to turn our full powers of creative imagination to control the forces we have unleashed and to blend them to man's use rather than to his destruction."

Hardesty research is still the quiet kind, directed toward the discovery of new products and new methods. Hardesty laboratory technicians, with long experience in the chemistry of fatty acids, provided many answers during the war to the shortages of imported raw materials. The high quality so inherent in every Hardesty product is a direct outgrowth of this research and experience. No matter what your manufacturing process may be, if you can use a Hardesty product it will pay you to keep in touch with us. Greatly expanded facilities, a fund of technical knowledge and experience are ready to contribute to solving your problems. Write today for information and samples. W. C. HARDESTY COMPANY, 41 East 42nd Street, New York 17, N. Y. Factories: Dover, Ohio; Los Angeles, Calif.; Toronto, Canada.

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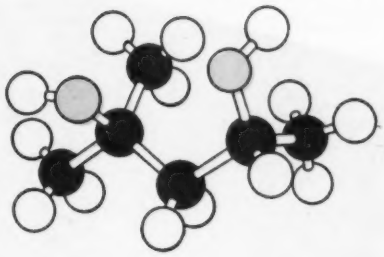
HEXYLENE GLYCOL

(2-METHYL-2, 4-PENTANEDIOL)

A Versatile Dihydric Alcohol



HEXYLENE GLYCOL[$(CH_3)_2COH.CH_2CHOH.CH_3$] is an excellent *high boiling solvent* (199°C).

Completely miscible with water, alcohols and ketones generally, aromatic and petroleum hydrocarbons and such materials as carbon tetrachloride, it is highly valuable as a *coupling agent* for otherwise immiscible liquids.

Mild humectant property increases its value where maintenance of a moist condition is desirable . . . penetrating and lubricating properties are excellent.

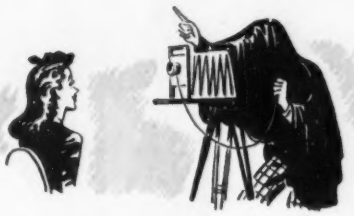
* * *

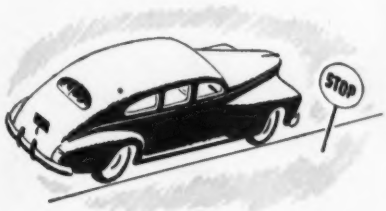
now available in semi-commercial quantities

The physical and chemical characteristics of Hexylene Glycol are such that it has possible application in a variety of industries. We suggest that you consider its use as:

HIGH-BOILING SOLVENT:

Textile Dyes (promotes dye penetration)
Photographic Film (reduces curling, increases flexibility)
Printing Inks (acts as penetrating agent)





COUPLING AGENT:

Hydraulic Brake Fluids (good solubility for castor oil—forms clear solutions)
Dry Cleaning Compounds (blends oils; adds solvent power)
Polishes (blending agent)
Cutting Oils (homogenizer)

HUMECTANT:

Leather Oils and Dressings (leather softening agent)
Casein glues (plasticizer)

PROPERTIES

Specific Gravity at 20/4° C.	0.922
Boiling Range at 760 mm.	195-199° C.
Flash Point, Tag open cup	205-210° F.
Vapor Pressure at 20° C.	0.02 mm. Hg.
90° C.	7.68 mm. Hg.
Refractive Index, $N\frac{20}{D}$	1.4274
Latent Heat of Vaporization	12,900 cal. gram mole at boiling point
Solubility at 20° C.	Completely miscible in water, acetone, toluene, carbon tetrachloride and octanes
Pounds per U.S. Gal. at 20° C.	7.68
Molecular Weight	118.17

For further information and uses of Hexylene Glycol, write for Technical Bulletin #SC:46-13.

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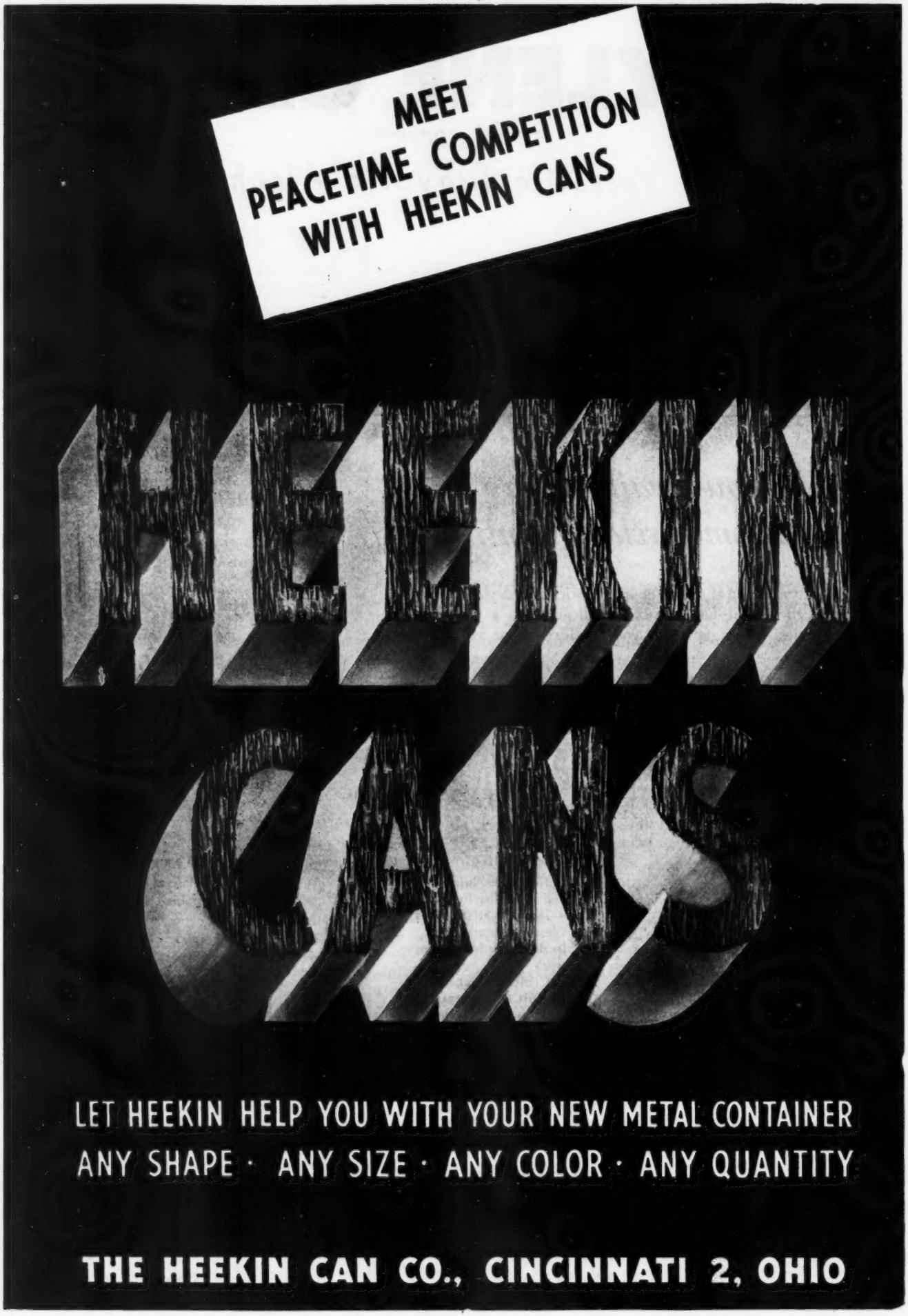
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A crystal gazer can't tell you how to use Nuchar activated carbon in your purification process, but Nuchar technicians can. Years of experience in this specialized field of purification by adsorption enable them to solve many apparently complicated problems quickly, easily and economically.

For example, Nuchar Activated Carbon frequently improves the melting point of crystals and gives higher purity to the product. Nuchar has been known to remove bodies that inhibit crystal growth, thereby giving perfectly formed crystals and, in some cases, higher crystal yields.

In addition to improving crystallization, Nuchar's tremendous adsorptive qualities find extensive use in purification in such industries as chemical and drug manufacture; wine and liquor; dyeing; food processing; water treatment; animal, vegetable, and essential oil processing; and many others.

Nuchar comes in many standard qualities for a variety of uses and in special qualities for specific problems. If you have a purification problem, our laboratory is at your disposal. Write today for information and samples.

Industrial Chemical Sales, Division West Virginia Pulp & Paper Company, 230 Park Avenue, New York 17, N. Y.

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SUPREME TEST OF UNIFORMITY

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The making of catalysts for industry differs in one respect. Purity is not always the only important factor. But uniformity to a pre-established quality from lot to lot and strict accuracy of analysis are vital.

For catalysis is a delicately balanced and painstakingly achieved process. Once the chemical composition is determined, adherence to specifications must be rigid, permanent, and uncompromising.

The J. T. Baker Chemical Company has been privileged, over a period of many years, to supply, uninterruptedly, chemicals especially prepared for catalytic application. These catalysts have been used in many of the nation's leading industries—industries such as plastics, the vegetable, oil and fat industries, organic solvent producers, petroleum chemical manufacturers, synthetic rubber producers and others.

To protect the interests of the customer, many of these chemicals are made on a confidential basis. Many are even code-numbered for the customer's protection. But all have one thing in common—so important to a manufacturer who needs a catalyst. The day by day and lot by lot analyses meet the supreme test—uncompromising uniformity.

If you need chemicals for catalysis, or any application where predetermined standards of purity are required, the J. T. Baker Chemical Company invites you to discuss your problem with them in confidence.

J. T. Baker Chemical Co., *Executive Offices and Plant:* Phillipsburg, N. J.
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LOOK TO COMMERCIAL SOLVENTS *for*

Dimethyl Phthalate

Diethyl Phthalate

Dibutyl Phthalate

Dibutyl Sebacate

The diverse properties and characteristics of these four plasticizers make them adaptable to a wide variety of needs. They are now used in formulations with various types of cellulose esters, synthetic rubber polymers, and resins; their compatibility with a wide variety of plastic and coating materials as well as their miscibility with most common organic solvents suggests a much wider range of application.

In addition to their use as plasticizers, these four chemicals have been suggested for such special purposes as:

- Solvents for dyes, oils, and other substances
- Greaseless lubricants for fibres and textiles
- Fixatives for perfumes and essential oils
- Liquid dielectrics, heat transfer agents and anti-foam agents

Commercial Solvents will gladly supply technical data on these materials and give you the benefit of its specialized experience.

COMMERCIAL SOLVENTS
Corporation
17 East 42nd Street, New York 17, N. Y.

PLASTICIZERS

PROPERTIES OF FOUR CSC PLASTICIZERS

	Dimethyl Phthalate	Diethyl Phthalate	Dibutyl Phthalate	Dibutyl Sebacate
Chemical Formula	$C_6H_4(COOCH_3)_2$	$C_6H_4(COOC_2H_5)_2$	$C_6H_4(COOC_4H_9)_2$	$[(CH_2)_4COOC_4H_9]_2$
Molecular Weight	194.18	222.23	278.34	314.45
Specific Gravity at 20 C/20 C	1.192-1.194	1.118-1.120	1.047-1.049	0.934-0.938
Pounds per U. S. Gallon at 20 C	9.93	9.31	8.72	7.79
Coefficient of Cubical Expansion	0.00042 per F 0.00076 per C	0.00041 per F 0.00074 per C	0.00041 per F 0.00074 per C	0.00043 per F 0.00078 per C
Freezing Point, C	5.5	—40.5	<—10	—8
Refractive Index at 20 C	1.516	1.502	1.489	1.442
Solubility ml per 100 ml at 25 C				
Plasticizer in Water	0.45	0.09	0.04	Insoluble
Water in Plasticizer	1.8	1.5	0.3	0.2

SOLUBILITIES OF IMPORTANT COMMERCIAL COATING MATERIALS AND COMPATIBILITY RELATIONSHIPS IN DRIED FILMS

Key: S—Soluble; PS—Partly Soluble; I—Insoluble; C—Compatible; Inc.—Incompatible

	Cellulose Acetate Acetyl Content—37%-42%		Cellulose Acetate Butyrate Acetyl Content—31% Butyryl Content—16%		Ethyl Cellulose Ethoxy Content—47%-48%		Vinyl Copolymers		Chlorinated Rubber	
Dimethyl Phthalate	S	C	I	C	S	C	S	C	PS	C
Diethyl Phthalate	PS	C	I	C	I	C	S	C	S	C
Dibutyl Phthalate	I	C	I	C	I	C	S	C	S	C
Dibutyl Sebacate	I	Inc.	I	C	I	C	PS	C	S	C

CSC Plasticizers are as near as your telephone. With branch offices and warehouses in principal cities and sales representatives in numerous lesser localities, Commercial Solvents is prepared to give prompt service. Its well equipped laboratories control the quality of all CSC products and render many specialized services to CSC customers. When selecting a source of chemical raw materials, due consideration should be given to the extra convenience and service made possible by such facilities.

NEVILLAC 10° *Plasticizer*

SPECIFICATIONS AND PROPERTIES

Specific Gravity at 15.6/15.6°C	1.075 to 1.10
Weight per gallon (average)	9.15 pounds at 15.6°C
Distillation Range	Essentially between 300°C and 370°C
Refractive Index at 25°C	1.597
Flash Point	Not below 290°F. No red label required
Color	Light amber ★
Iodine Number (average)	44
Acid Number	Less than 5
Saponification Number	Less than 5
Molecular Weight (average)	240
Appearance	Honey-like oil, very viscous
Odor	Phenolic
Corrosion (Copper Strip)	No darkening, but very slight solvent action on copper
Viscosity, absolute at 25°C	235 poises

★ Color of Nevillac 10° has been improved and is much lighter than offered over last few years.

NEVILLE

Nevillac 10° Resin, also known as PHO, is a most versatile material with respect to solubility and compatibility. This material is soluble in all commonly used solvents, except water and glycerol. It is soluble in ethylene glycol.

It is compatible with most synthetic resins including cellulose esters and ethers (nitrocellulose, ethylcellulose, cellulose acetate, etc.), vinyl acetate, vinyl butyral, zein, nylon, and partly compatible with vinyl acetate and chloride copolymer.

Due to the fact that Nevillac 10° is a hydrindylphenol derivative, it possesses many of the chemical characteristics and much of the solvent power of hydroxy-type solvents such as phenols, and aromatic hydrocarbon type solvents such as benzol or toluol. For this reason, it is capable of acting as a mutual solubilizing agent for resins, oils, cellulose derivatives, and the like, which are normally incompatible.

It will pay you to investigate this widely adaptable plasticizer. Request your gratis sample today.

THE NEVILLE COMPANY

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Chemicals for the Nation's Vital Industries

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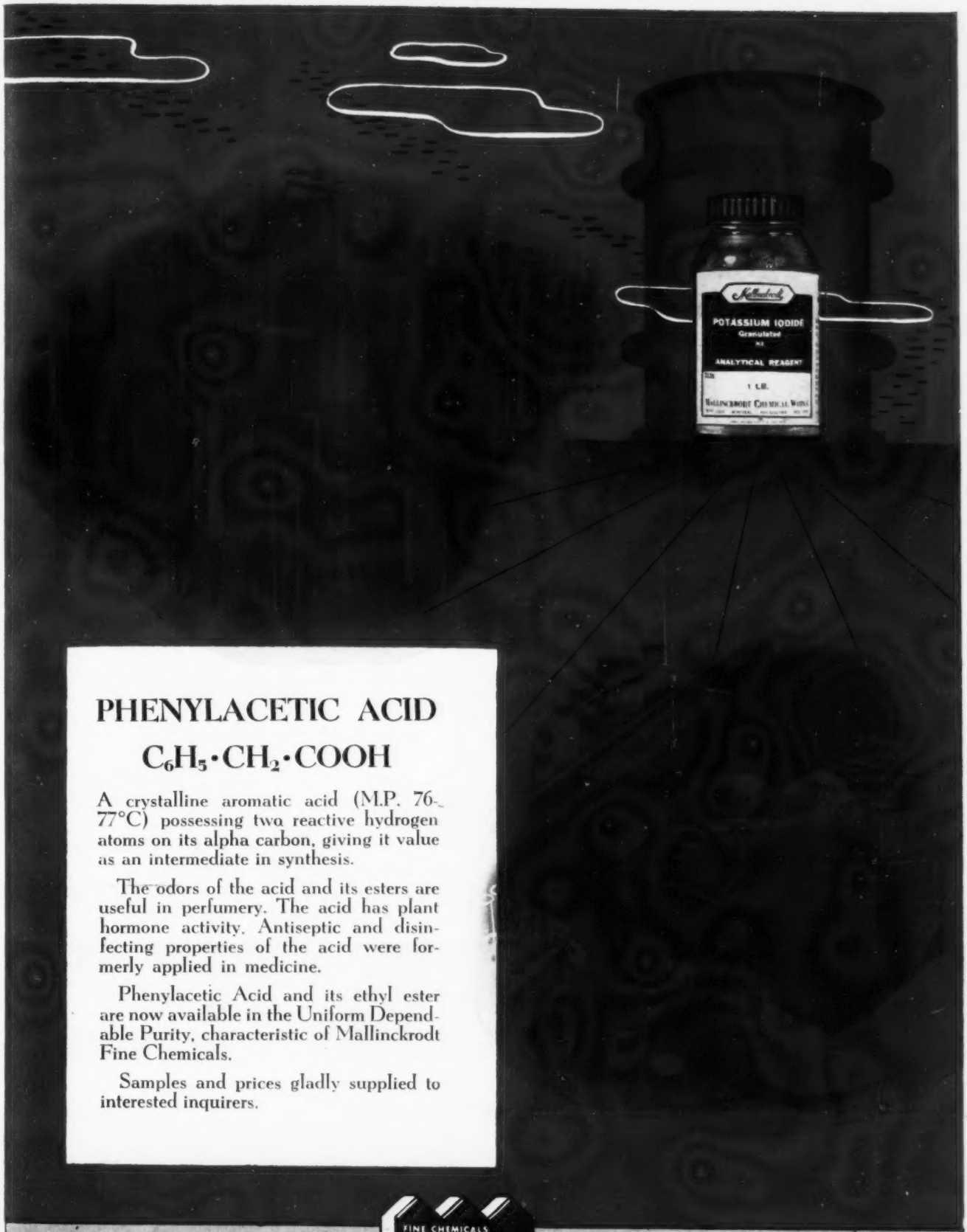

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$C_6H_5 \cdot CH_2 \cdot COOH$

A crystalline aromatic acid (M.P. 76-77°C) possessing two reactive hydrogen atoms on its alpha carbon, giving it value as an intermediate in synthesis.

The odors of the acid and its esters are useful in perfumery. The acid has plant hormone activity. Antiseptic and disinfecting properties of the acid were formerly applied in medicine.

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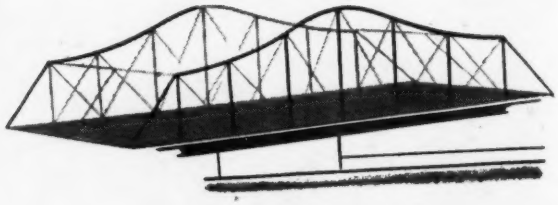
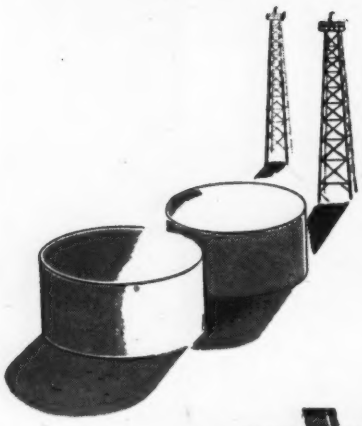
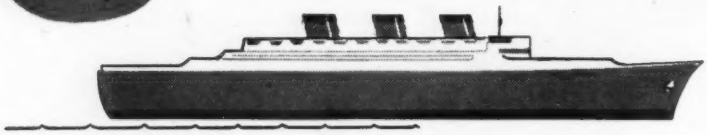
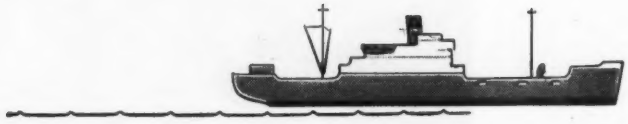
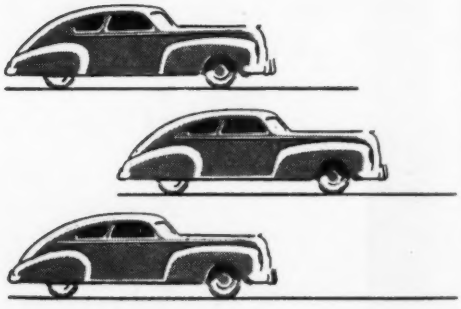




improve corrosion resistance







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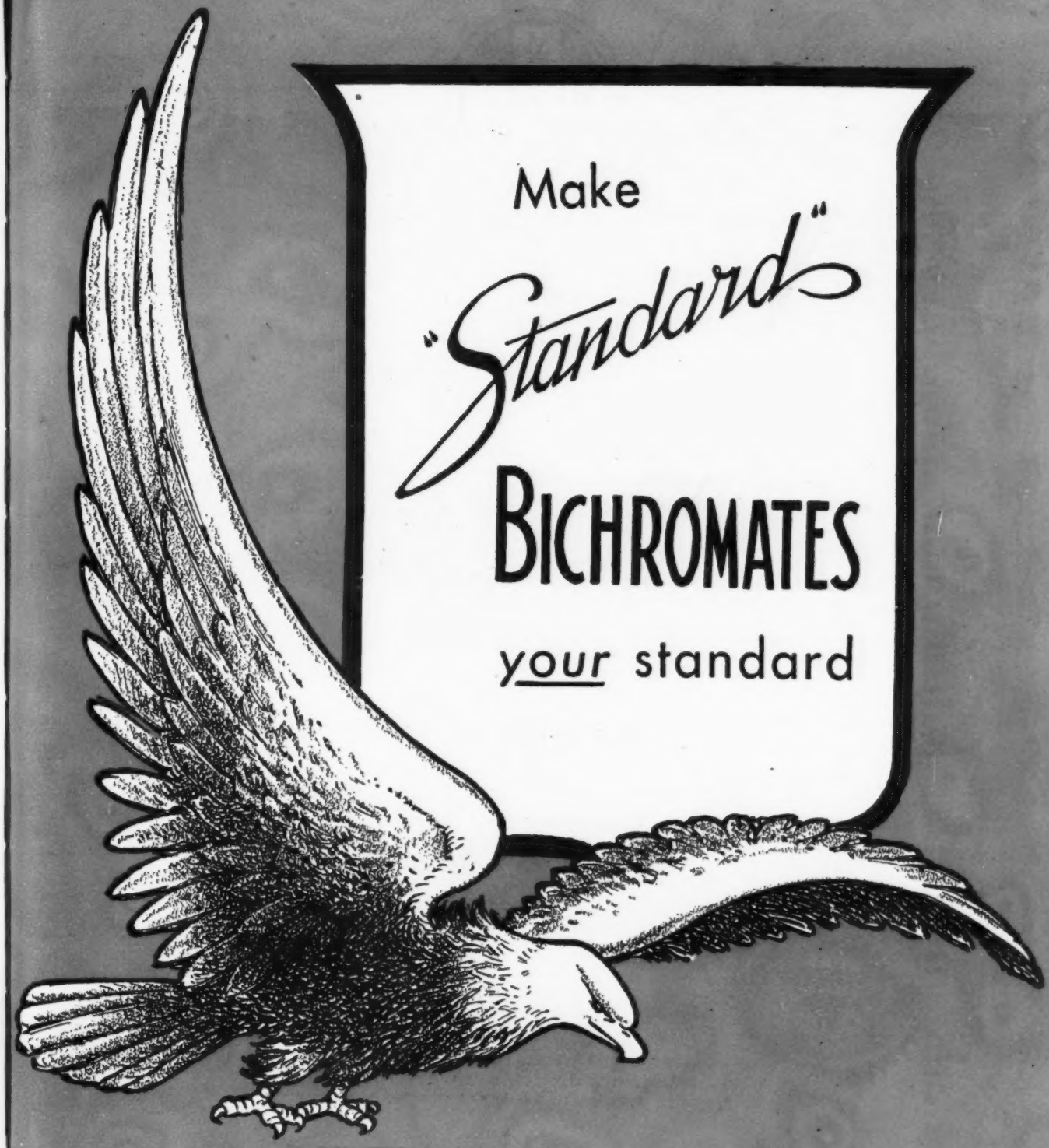

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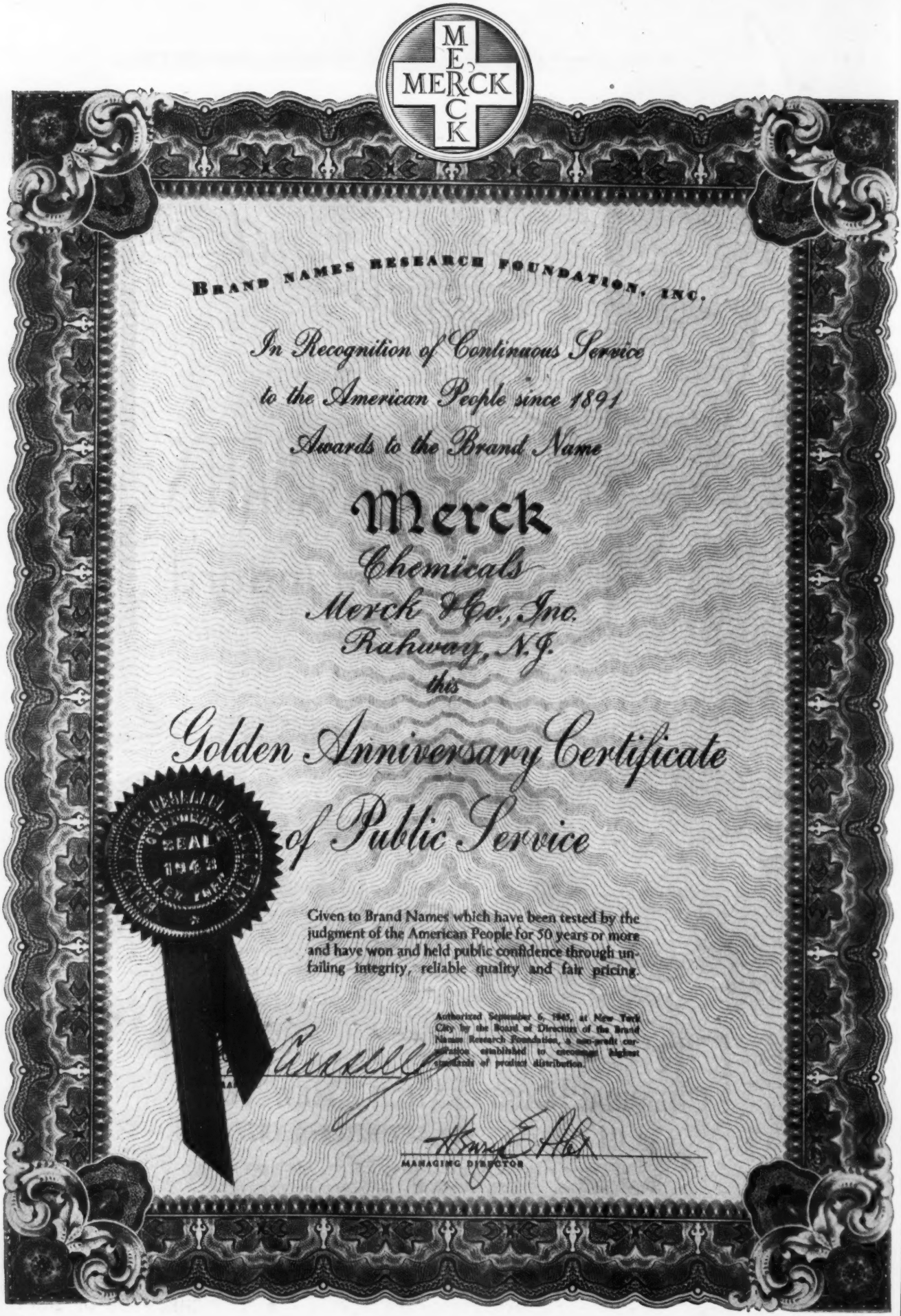
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MANAGING DIRECTOR

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THE PURSUIT FOR EXCEPTIONAL purity and quality in General Chemical B&A Reagents is tireless and never ending.

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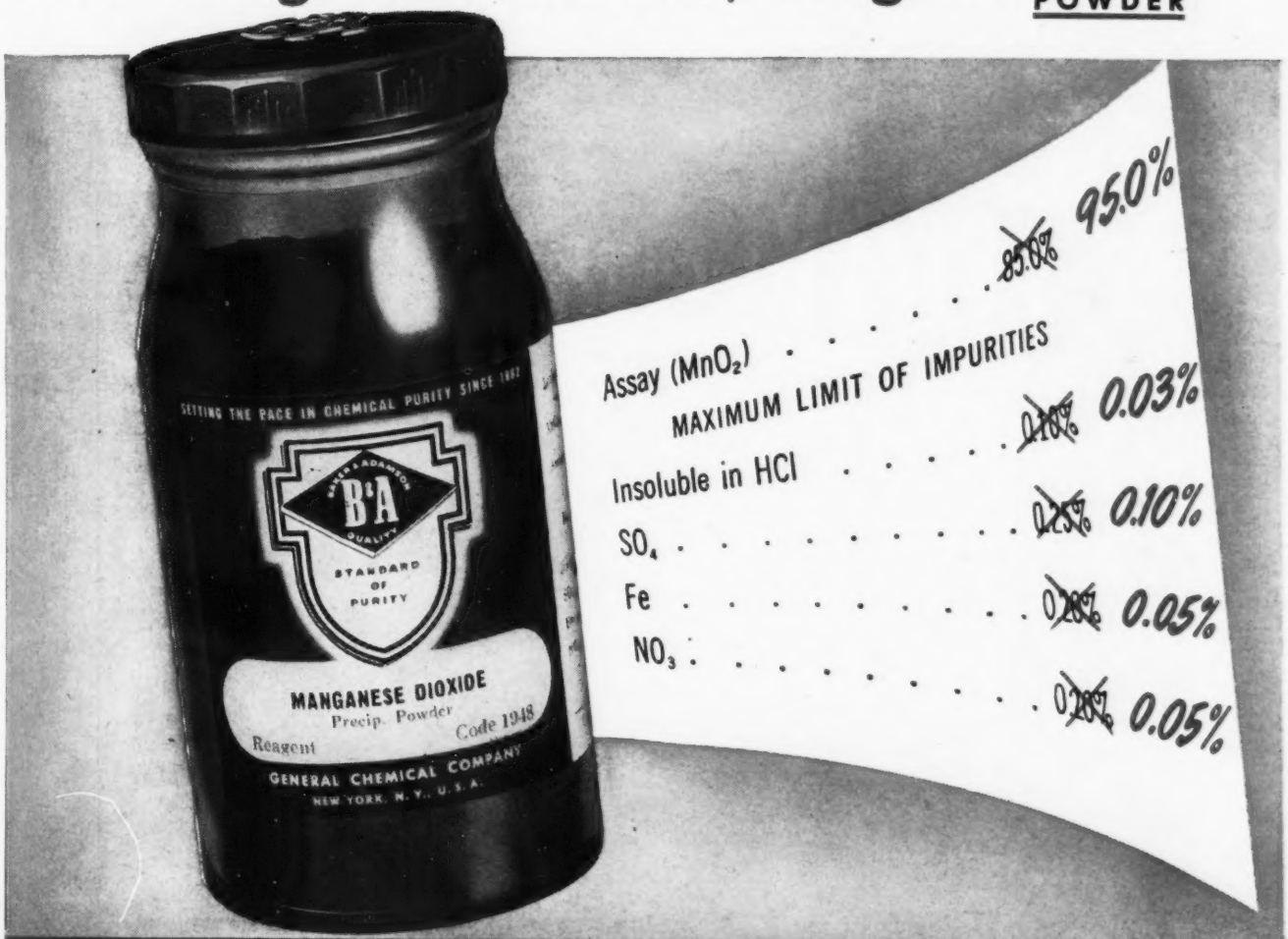
THE ACHIEVEMENTS OF B&A with this product are typical of those sought and gained day by day for all B&A Reagents in every step of research, development, and production. That's why, when you specify reagents bearing the B&A Shield of Quality, you specify the best in laboratory chemicals . . . reagents that will always be recognized as "setting the pace in chemical purity."

B & A manganese dioxide, reagent PRECIPITATED, POWDER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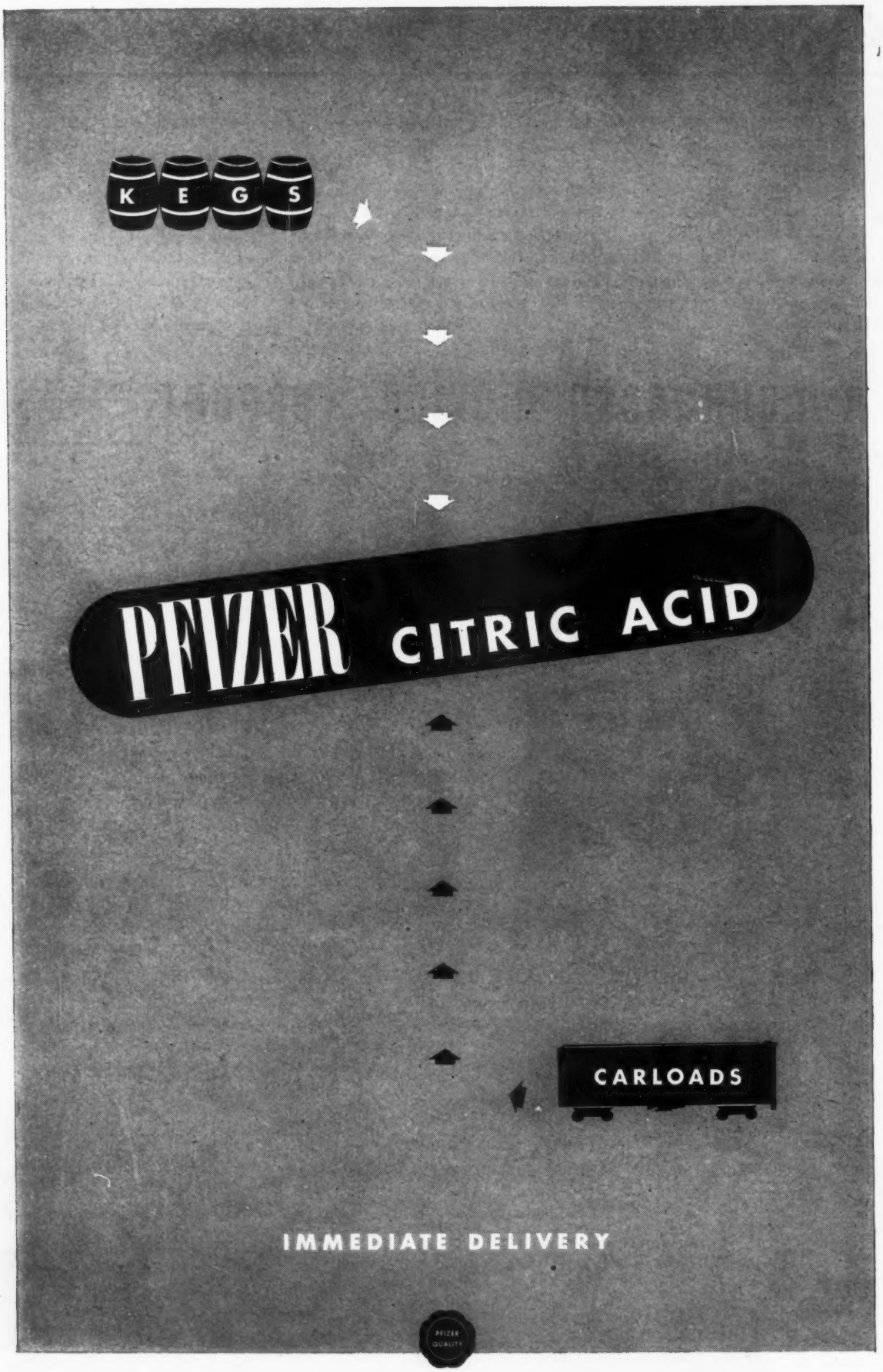


CHAS. PFIZER & CO., INC., 81 Maiden Lane, New York 7, N. Y. ★ 444 West Grand Avenue, Chicago 10, Ill.
605 Third St., San Francisco 7, Calif.

For Low Temperature Flexibility Try These Fatty Acid Esters

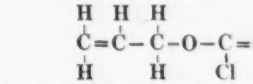
These Hooker products show promise as plasticizer extenders with a number of the resins and other film forming materials commonly in use. The physical properties of these esters indicate their possible value for imparting low temperature flexibility for those resins with which they are compatible. Fire resistant properties are also suggested for the stearates as at elevated temperatures there is a slight evolution of HCl.

In addition to the plasticizing properties, these fatty acid esters are of potential value as chemical intermediates in organic syntheses as they undergo typical ester reactions.

Principal specifications and characteristics are given below. Technical Data Sheets giving physical and chemical properties, and samples will be sent when requested on your letterhead. The services of our Technical Staff are also available on the application of Hooker Chemicals to your particular needs.

HOOKER RESEARCH *Presents*

ALLYL CHLORFORMATE



Here is a recent product of Hooker Research Laboratories that is worthy of consideration by chemists engaged in organic synthesis and in working with resins. The presence of the unsaturated allyl radical coupled to the reactive chlorformate group affords a versatility that makes this chemical valuable in many different areas. Allyl Chlorformate has a Boiling Range from 108 to 114°C. Freezing Point is below −75°C. Specific Gravity at 15.5/15.5°C is 1.143 ± .004. It is a clear water white mobile liquid. It is difficultly soluble in water, but miscible with most organic solvents. The Hooker product has a purity of 99.5%.

Technical Data Sheet 351 contains physical and chemical properties and is available upon request. Samples also will be furnished to those interested when requested on business letterhead.

METHYL PENTACHLOR STEARATE, $C_{19}H_{33}O_2Cl_5$ (approx.), a viscous yellow to reddish brown liquid.

Specific Gravity at 15.5/15.5°C	1.205
Boiling Point at 25 mm	approx. 200°C
Freezing Point	−39°C
Flash Point	164°C
Fire Point	252°C

Its vapor pressure up to 140°C is very low; above this temperature evolution of HCl is small but measurable. It is insoluble in water, but soluble in many organic solvents. Hooker Methyl Pentachlor Stearate is made from commercial stearic acid and is a mixture of stearates and palmitates. As a plasticizer extender for polyvinyl chloride films it imparts flexibility at low temperatures and increases fire resistance. It is also compatible with vinyl chloride, vinyl acetate and other film forming materials.

METHYL STEARATE, $C_{17}H_{35}COOCH_3$ (approx.), a yellow to light brown, semisolid, oily material.

Specific Gravity at 15.5/15.5°C	0.862
Boiling Range at 13 mm	189 to 237°C
Freezing Range	32 to 33°C
Flash Point	153°C
Fire Point	188°C
Acidity (as stearic acid)	less than 0.5%

It is insoluble in water, but soluble in most organic solvents. Hooker Methyl Stearate is manufactured from regular commercial stearic acid and is a mixture of the stearate and palmitate. It is suggested as a plasticizer extender for lacquers and other coating materials, as an emulsifier and softener for various waxes and resins, and as a dye carrier.

TETRAHYDROFURFURYL OLEATE, $C_{17}H_{33}COOCH_2OC_4H_7$, a yellow to light brown oily liquid.

Specific Gravity at 15.5/15.5°C	0.931
Boiling Range at 16 mm	200 to 285°C
Pour Point, ASTM D97-39	−22°C
Flash Point	199°C
Fire Point	242°C

It is insoluble in water, but soluble in most organic and chlorinated solvents. It shows good plasticizing qualities with polyvinyl chloride and is also compatible with benzyl cellulose, natural asphalt, nitrocellulose, vinyl polymer, polyvinyl acetate and other film forming materials.

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Paradichlorbenzene **Chlorine** **Sodium Sulfhydrate**

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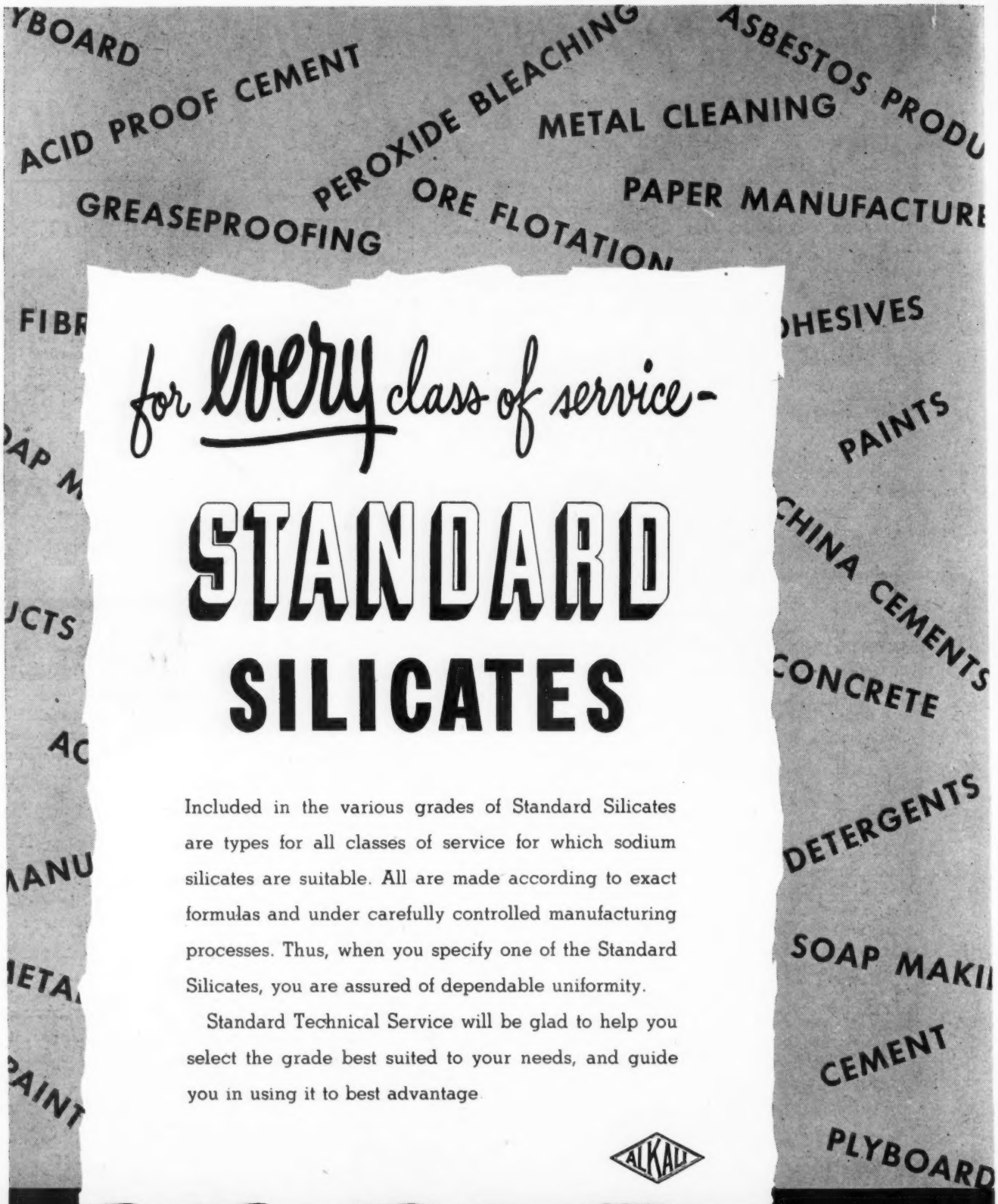

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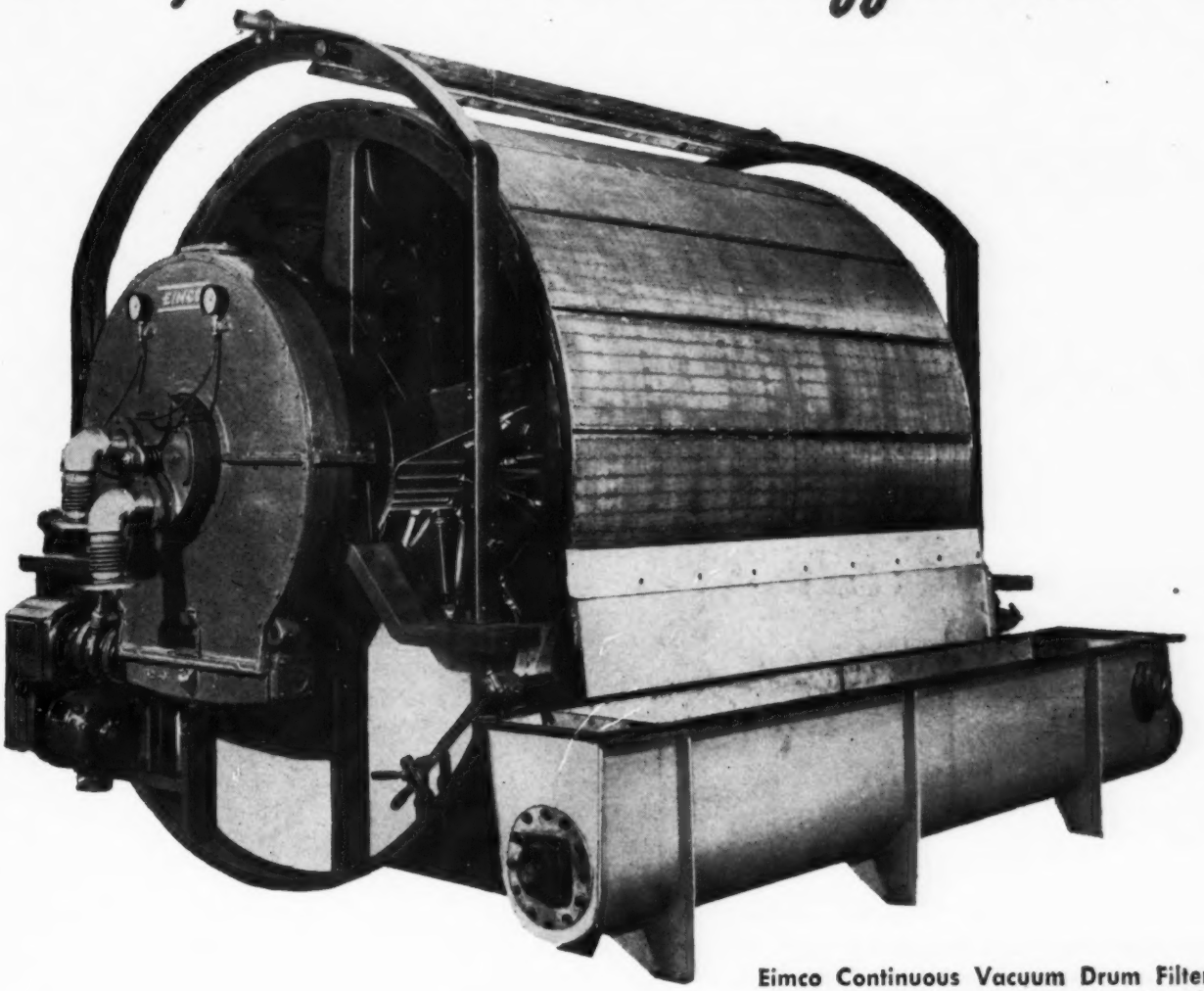
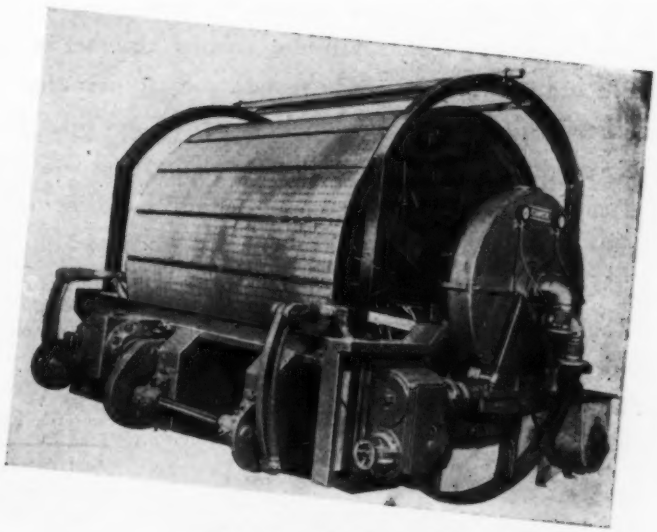


Eimco Continuous Vacuum Drum Filter size 8' dia. x 8' face for Processing Starch

If it is, the chances are that standard equipment will not meet your requirements. EIMCO Engineers understand the importance of meeting specifications that are different — no matter what the filtration problems might be, they are prepared to draw on a wide experience and build the kind of vacuum filter that will offer the maximum production of filter cake or washed solutions.

EIMCO Continuous Vacuum Filters are available in Drum or Disc type from laboratory size to large machines with more than 2000 sq. ft. of filter area. EIMCO Filters are now in use in Chemical, Metallurgical, Food, Cement, Sewage and Ceramic fields.

Write for more information on EIMCO'S equipment for the process industry.



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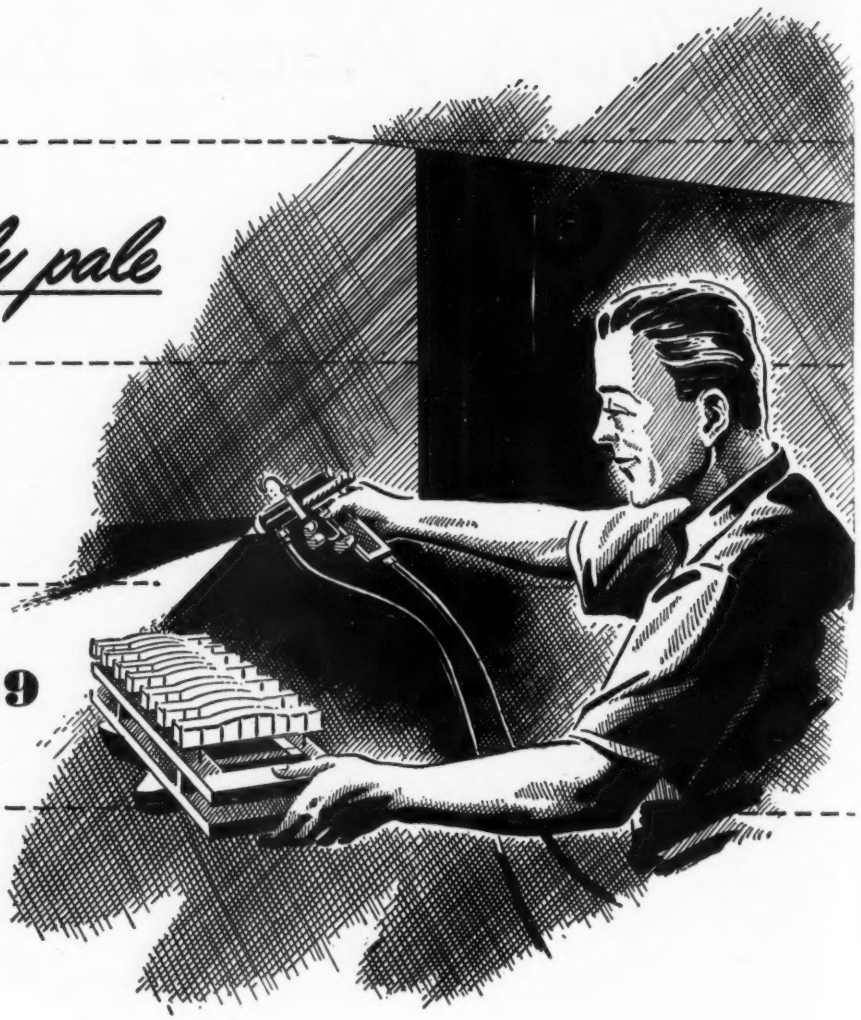
R114

Now...

an exceptionally pale

maleic resin

AROCHEM 519



Immediately available without restrictions, Arochem 519 is an exceptionally pale lacquer and varnish resin having excellent color retention as well as very rapid solvent release. A modified maleic, it is especially suited for use in sanding sealers, finishing lacquers, lacquer enamels, general utility lacquers, tin decorating varnishes and enamels, and a general line of air-drying or baking finishes. White enamels based on this resin show little after-yellowing . . . retain their original luster even after extended exposure.

Two similar resins of long established use — Arochem 520 and Arochem 545 — possess the same general properties as Arochem 519. Arochem 520 is not quite as pale as 519, while Arochem 545 is designed for extreme hardness and color retention. They are also readily available.

For samples or further data, phone or write U. S. Industrial Chemicals, Inc.

Specifications

	AROCHEM 519	AROCHEM 520	AROCHEM 545
Acid number	25-35	25-35	25-35
Melting point	140°-145°C	140°-145°C	145°-150°C
Color (G.H.1933)	5-7	7-9	8-10
Specific gravity	1.1	1.1	1.1

U.S. INDUSTRIAL CHEMICALS, INC.

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Synthesis of acetylenic carbinols

For further information, write for technical data sheets, I-46, on Lithium Metal and Lithium Compounds, inorganic and organic. Lithaloys Corporation, 444 Madison Ave., New York 22, N.Y.

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Lithium Peroxide • Lithium Methylate • Lithium Carbide • Lithium Nitride
Lithium Master Alloys • Calcium Hydride • Calcium Nitride

* Lithium Metal is furnished in billets, sand, globules and wire. Lithium wire is a most convenient form for use in producing Lithium alcoholates, alkyls and aryls.

LITHALOYS
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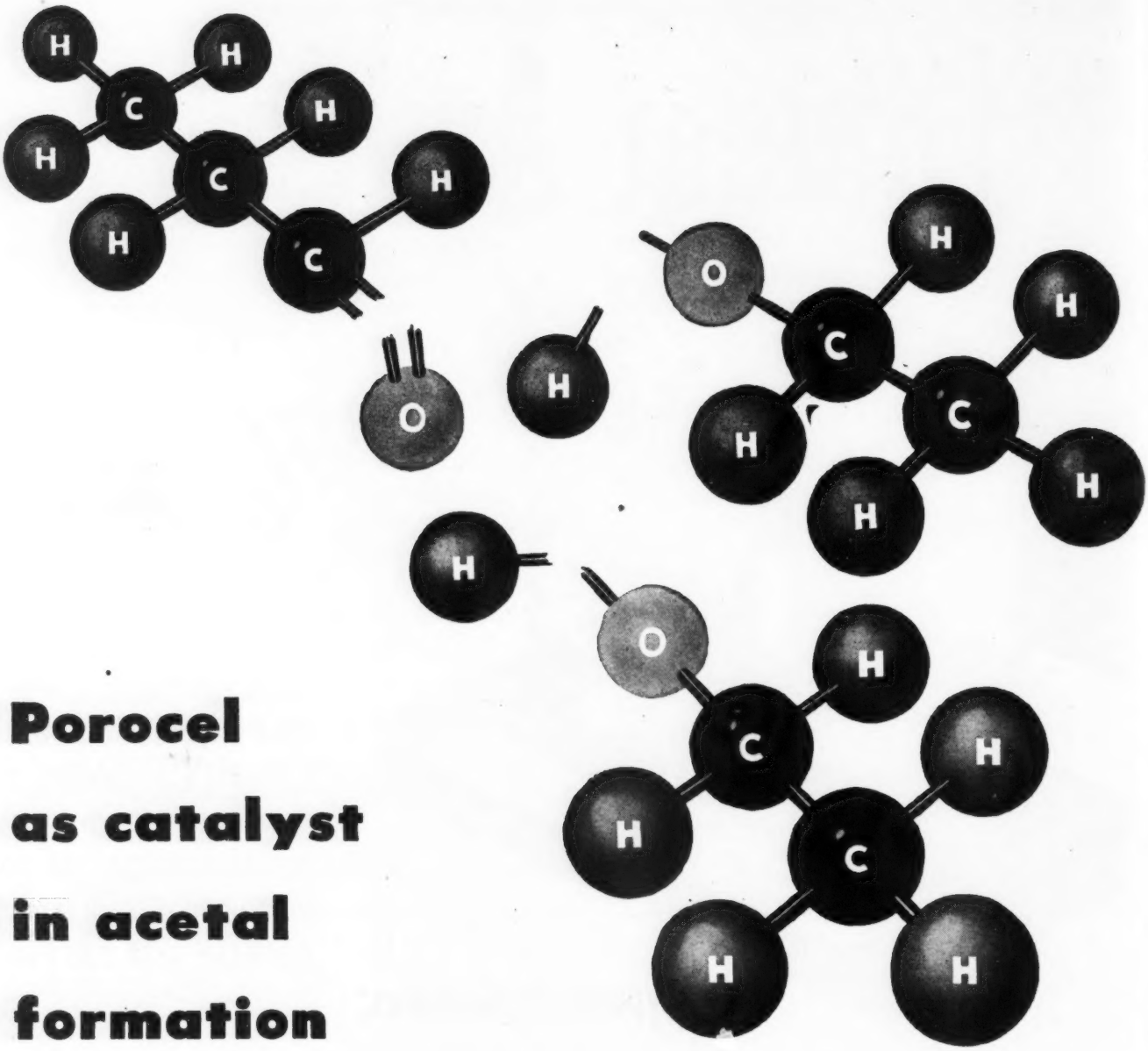
Recognized Authority on LITHIUM



Porocel as catalyst in acetal formation

The production of acetals by the reaction of alcohols with aldehydes has been successfully catalyzed by Porocel. Typical of these reactions is that of ethyl alcohol with propionaldehyde by the simple liquid phase percolation of the reactants through Porocel.

The ability of Porocel to promote dehydration reactions has been noted in many applications. Alcohols react with ammonia in its presence to produce amines. Porocel may also be used to convert glycerol to acrolein, acetone to mesitylene and fatty acids to esters or nitriles.

Dehydration with Porocel is a continuous process, giving the producer all the cost-saving advantages of this method. Further savings are made possible by the low initial cost of Porocel and the ruggedness of the granules, which do not deteriorate under severe conditions of temperature, flow, regeneration and handling.

Our research staff and engineers are studying the catalytic action of Porocel in many dehydration reactions. The facts they have assembled may help you improve your own process or reduce costs. We shall be glad to place them at your disposal without obligation. Just write Attapulgus Clay Company (Exclusive Sales Agent), 260 South Broad Street, Philadelphia 1, Pennsylvania.

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ORONITE CHEMICALS

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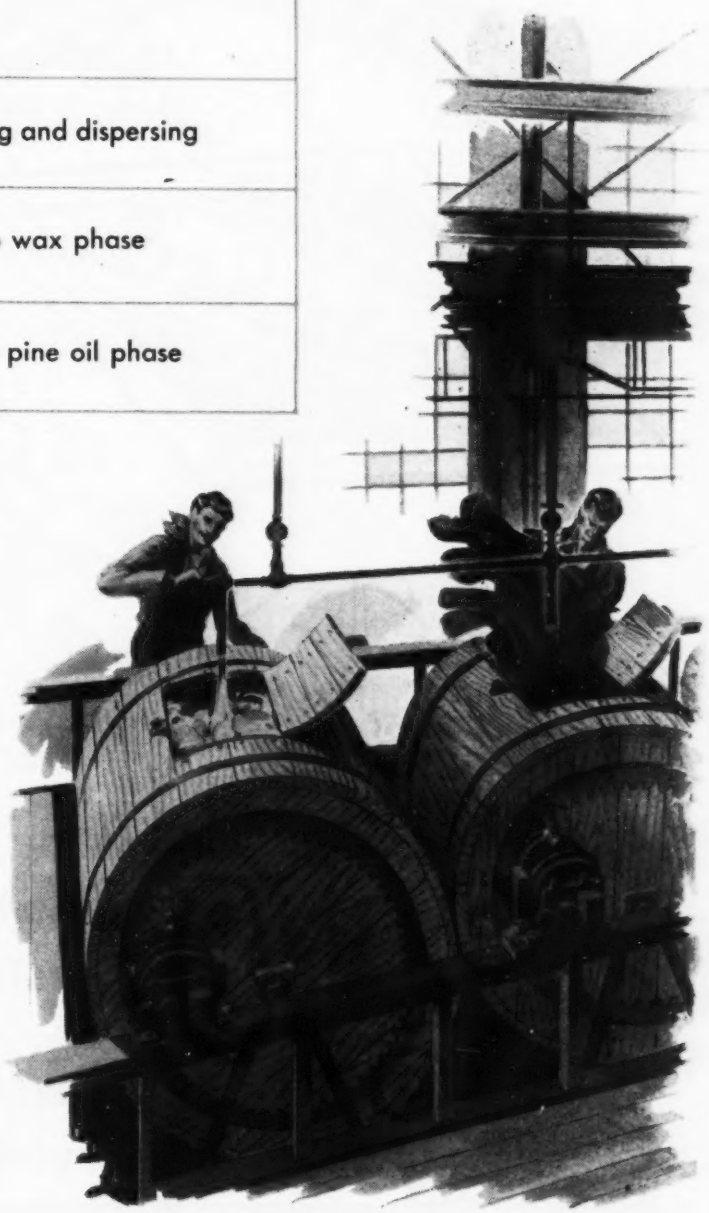
THE NAME TO WATCH IN CHEMICALS

ORONITE SODIUM SULFONATE No. 5

--oil-soluble emulsifier

APPLICATIONS	PROPERTIES CONTRIBUTED
Soluble Oils	Emulsifying action
Detergents	Wetting, emulsifying and dispersing
Wax Emulsifiers	Imparts polarity to wax phase
Pine Oil Emulsion	Imparts polarity to pine oil phase



Oronite Sulfonate No. 5 has a molecular weight above 600. It is free of inorganic salts, insoluble tars and practically all water, making it a highly oil-soluble, surface-active agent. It is heavy in consistency and only slightly water-dispersible. Its special combination of properties gives it a wide range of uses in emulsions, as shown above, when properly compounded with water-soluble soaps.

Further details regarding this and other Oronite Sulfonates will be promptly supplied if you will write on your business letterhead, telling us the applications you have in mind.

1185

TYPICAL TESTS:	
Content by Weight:	
Sodium Sulfonate	29%
Sodium Naphthenate	17
Oil Content	54.1
Water	None
Sodium Sulphate	None
Viscosity (Saybolt seconds at 210°F)	750
Specific Gravity 60°	0.98
pH (5% dispersion in water)	8.9
Flash (open cup)	300°F
Weight, lbs. per gallon	8.2

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Product vs. Process

by ROBERT L. TAYLOR, editor

THE PRODUCT VERSUS THE PROCESS VIEWPOINT has long been a source of good debate among those concerned with development in the chemical industry. It may become more so in the weeks and months immediately ahead. As individual companies progress in their plans for expansion of peacetime operations, management will be required to make an increasing number of decisions based on intelligent evaluation of these two approaches to profit.

The characteristics of each viewpoint are well known, and each has its adherents in varying numbers in every chemical company.

On the one side, the product-emphasis approach usually finds its principal supporters among those who are concerned with new product research. Given a problem, this viewpoint usually tends to consider the job finished when a suitable product and a workable way of making it have been found. It is inclined to become impatient with anything that interferes with getting the product into immediate commercial scale production, especially if it can be demonstrated that the material can be made for a price at which a profitable market already exists.

On the opposite side, the process-emphasis viewpoint is found principally among engineers and process development people. Its argument is that profits can be greatly increased on a new product and competitive position strengthened by spending more time on engineering development before designing the commercial plant. Time spent on achieving high engineering efficiency in the design stage will be several times as valuable as the same time spent later on. Building an inefficient plant means less output as well as more rapid depreciation and obsolescence, both of which cut down return on the investment.

Companies as well as individuals frequently allow themselves to become partisan in their attitude toward product and process development. The dye industry for years so concentrated on products that its technology was far behind that of other branches of chemical industry. Production methods consisted of little more than laboratory techniques blown up to plant scale, and the inefficiencies were reflected in the prices of dyes. The petroleum industry, on the other hand, long the master of chemical engineering design and process efficiency, has only recently awakened to the profit possibilities in the many products other than fuel and lubricants that can be obtained from its raw materials and by use of its production methods.

In the highly fluid period ahead there will be no place for custom or prejudice in chemical development thinking. Competitive position, as well as overall industry progress, will require that every situation be looked at critically, that each new project be analyzed coldly and independently in relation to all of the possibilities and to internal as well as external conditions.

This is where alert management must rise to its responsibilities. It is management's job to integrate effort, guide, make the right decisions at the right time. On an individual project it must balance the advantage of speed in getting the product onto the market with the more time-consuming but longer range benefits of better design and engineering. The successful manager will combine the product-process considerations in a way to gain the greatest initial advantage together with maximum follow-up to maintain position.

Two things stand out in the phenomenal growth of the American chemical industry over the past thirty years. One is the large number of new chemical products that have been introduced on a commercial scale. The other is the consistent decline in the prices of these products over the years. The first can be attributed to product emphasis; the second to process emphasis. Both are important ingredients in the formula for success in the chemical business.

Individuals, companies, and the industry as a whole will enjoy greater prosperity if they do not forget this. "More goods at lower cost" is likely to continue as a sound business philosophy for a long time to come, despite the apparent efforts in other directions by some groups in our society. It can be achieved in practice, however, only through management's balanced consideration and coordination of all avenues of effort.

Political Scientists

WE VIEW WITH MIXED FEELINGS the mass entrance of scientists into the political arena, particularly evident since last August. Groups have sprung up throughout the country, all capitalizing on the word "scientists" and frequently relying heavily on their "atomic" con-

nections. The purpose of these organizations is avowedly political—to mold public opinion. Their stated objectives may be eminently desirable, but the potential dangers inherent in all mass activities should not be overlooked.

Most of these associations have been founded, and are controlled, by a handful of men. Some of them are scientists of repute but politically immature. Too many attempt to convey the impression that they know all the answers—nationally and internationally—and via their organizations these opinions are foisted on the layman as representative of the thinking of *all* scientists. Publicity men have been retained, and by adroit phrasing of "news releases" facts have been grossly misrepresented in the national press.

Too, the naïveté of some scientists is quite startling. Recently, hearing of the establishment of one such organization in New York, we called one of the men listed as a prime incorporator. His name is well known; he holds an eminent professorial post; his affiliation with the group means much to its prestige.

We asked how many members the association had. He had no idea, couldn't even guess. Did it have any national or international affiliations? He was not sure, but believed there was some talk of a convention in England this summer. Several "atomic scientists" were listed as founders—was such the case? He believed so, he knew one, but had no idea as to what responsibilities he might have had. Was the enrollment of a large number of "atomic scientists" anticipated? Possibly, but *anyone* was welcome.

The last sentence is especially significant. Such groups can easily come under the control of persons who are spreaders of alien ideologies. We have seen it happen in other countries. It can happen here.

For the present, we may well regard the published views of such recently formed scientific groups, particularly on the subject of atomic energy, charily and analytically. We must guard against the term "scientist" being exploited, to mis-mold public opinion, or mis-direct national action.—W. A. J.

Is Your Obsolescence Intelligence Working?

THERE IS REASON TO BELIEVE that many chemical plants during the past five years—whether their owners know it or not—have moved into the category of high cost producers.

It is not difficult for this to happen almost unnoticed during a prolonged period of peak demand and firm prices. It is even more likely now as a result of wartime advances in processes and equipment.

Where such conditions exist, the present is certainly the time to find out about them if a rude awakening is to be avoided later on. If equipment is antiquated and inefficient, now is the time to replace it. If the process is out of date, it may be better to write it off against a profit than to risk compounding future losses. Simply because a plant is being depreciated over fifteen years is no reason it cannot be obsolete in ten. Man's productivity is no longer measured by the hours he works but by the capacity and efficiency of the machines he operates.—R. L. T.

Niche for Small-Scale Research

IN HIS PRIESTLEY MEDAL ADDRESS, Sir Ian Morris Heilbron epitomized the modern trend in chemical research in two sentences: "Gone are the days of Priestley and Faraday, who with little or no assistance could carry out highly significant experiments. Almost all of our major chemical problems now require the coordinated efforts of research teams, in which each individual forges an important link."

A hundred years ago all the important known facts of physical science could be contained on a few bookshelves. Now the area of knowledge has become so vast that one man cannot be expected to be intimately acquainted with more than a small province of it. The easy things have been done. Further advances will depend upon more and more specialized training in more and more complex knowledge gained by the use of more and more intricate equipment. Research is becoming a big, and expensive, business.

What can the small chemical concern with limited funds do in the face of this trend?

An English writer, Sir E. Raymond Streat, has wrestled with this problem. One obvious solution—amalgamation into larger units or nationalization of industry—he rejects: "I . . . believe that as regards qualities of initiative and flexibility the small-scale enterprise has something which from a commercial angle . . . is a national asset . . . I also believe that the small concern has a moral and psychological significance in the life and outlook of our society and that we should be a great deal poorer, in human values, if everybody of necessity had to be the servant of a vast corporation or the State itself."

Rejecting amalgamation or nationalization, what is the alternative? The same writer suggests, and plausibly we believe, that the small concern should let the universities, the large corporations and the governments support fundamental investigations. It should confine itself largely to application research—applying scientific knowledge to the detailed problems of its own business. The intimacy of management with these problems, in a small concern, gives it an advantage along such lines of endeavor.

Such a course will not produce radar, penicillin, or an atomic bomb. But it will cut 5 per cent of the costs here, and raise the yield 8 per cent there, and save 3 per cent of the labor in some other operation. Small advantages adopted more quickly, as they can be by a small, flexible management, may well give big business, especially if it is boned and stayed by hidebound organization, a run for its money.—H. C. E. J.

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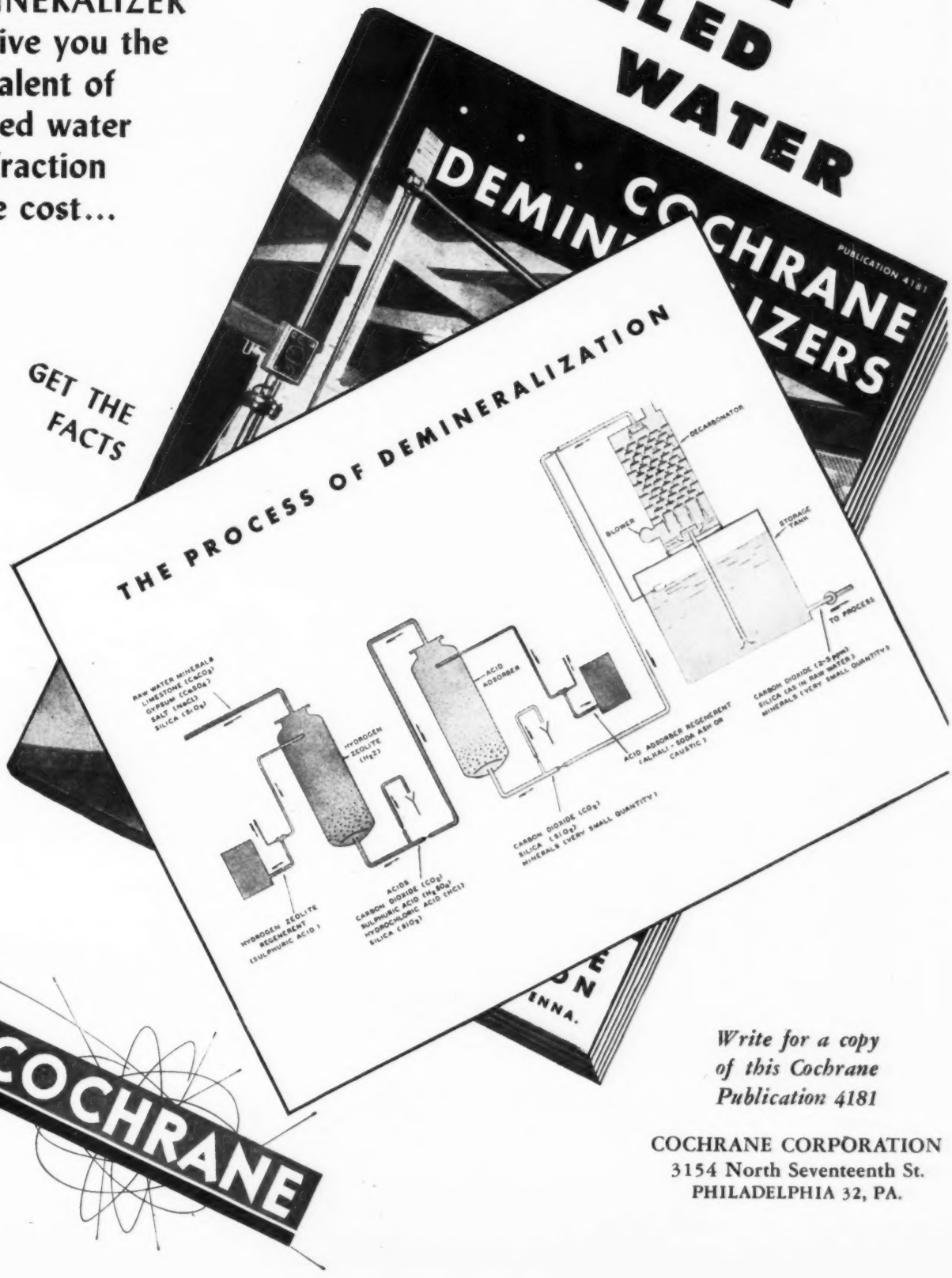

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Reacts with fatty acids to form soaps

Readily soluble

Forms strong basic solutions

Available in 30-31% aqueous solution

Easily recovered by heating

Raw material for synthesis

CSC Properties of MONOMETHYLAMINE

Molecular Weight: 31.06

Boiling Point: —6.0 C to — 5.5 C at 768 mm Hg

Specific gravity: 0.699 at — 10.8 C/15 C

Solubility: Very soluble in water and in alcohol. Also in ether. At 25 C water will dissolve 959 times its volume of Monomethylamine.

Flash point (30% solution): Approx. 0.3 C (32.5 F)

Weight per U. S. Gallon (30% solution): Approx. 7.7 lb. at 68 F

*Note: Compare with data on Dimethylamine and Trimethylamine

Samples and technical data will be sent on request.

COMMERCIAL SOLVENTS *Corporation*

17 East 42nd Street, New York 17, N. Y.

Chemical Company Operations IN 1946

by MICHAEL PESCATELLO
New York, N. Y.

SHOWING AGGREGATE SALES and net income virtually unchanged from 1944, the combined 1945 financial reports of twenty-nine leading chemical companies indicate that the industry reached its wartime peak last year. Working capital positions of most of the companies continued to improve, and dividends were increased slightly, although a relatively large share of earnings was again put back into new developments and expansion. On the basis of the new tax rate, it is estimated that chemical producers in 1946 must do about one-third more business than their best prewar years in order to report the same amount of earnings.

THE MOST striking change in the composite of twenty-nine leading chemical companies in 1945 was the increase in the aggregate market value of their equities by approximately one billion dollars over the 1944 year-end figure. The reason for this spectacular change in evaluation of these enterprises by the great mass of investors in the course of twelve months cannot be found by comparing 1945 figures with those of 1944. Probably the most significant cause is the elimination of the high excess profits tax rate which effectively kept net income at prewar levels.

Last year, sales of 27 out of the 29 chemical companies totaled $2,389,800,000, or slightly less than in 1944, but 140 per cent above the one billion dollars of sales reported in 1939. It is thus evident that the industry reached its peak volume in 1944 and declined very little from this peak in 1945 despite the abrupt cessation of hostilities last August.

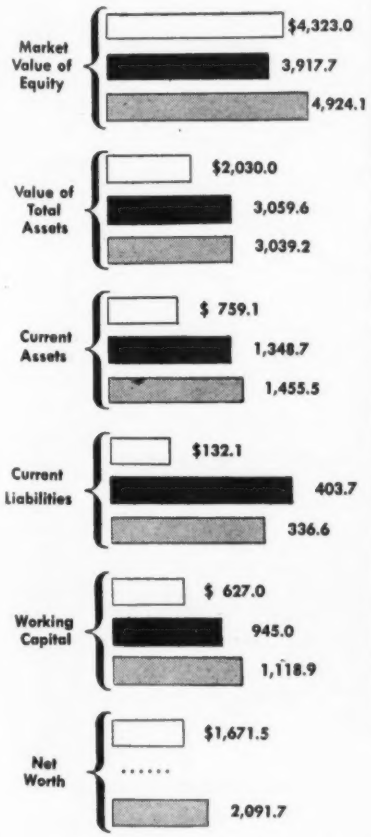
From the end of 1939 to the year end 1945 these companies increased their assets by slightly more than one billion dollars, or by 50 per cent. Sales per dollar of total assets amounted to approximately 83 cents last year compared to 52 cents per dollar of assets in 1939.

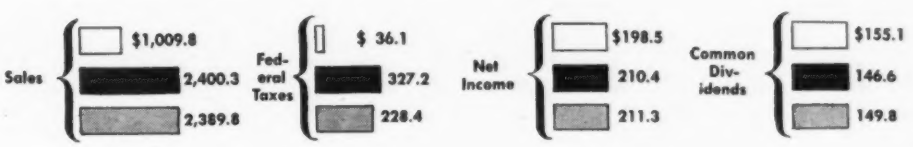
The current position of these chemical companies continues to show progressive improvement. At the end of 1945 current assets were more than $100 million larger than at the end of the previous year. But the comparison with 1939 is of significance by virtue of the fact that current assets increased by almost $700 million or 92 per cent. Last year, current liabilities declined from $403 million at the end of 1944 to $336 million. The latter

COMPARATIVE FINANCIAL SUMMARY OF 29 CHEMICAL COMPANIES FOR THE YEARS 1939, 1944, 1945

Note: Sales exclude American Cyanamid and Sylvania Industrial which do not report these figures. Hooker Electro-chemical sales figures for 1939 unreported.

DOLLAR FIGURES IN MILLIONS; balance sheet figures are at year end





TWENTY-NINE CHEMICAL COMPANIES---COMPARISON 1945, 1944 AND 1939

(All figures in millions of $)	Year	Year End: Market Value of Equity	Year End: Total Assets	Year End: Current Assets	Year End: Current Liabilities	Year End: Working Capital	Sales	Federal Taxes	Net Income	Common Dividends
Air Reduction	1939	146.1	44.2	20.0	3.4	16.6	27.6	1.0	5.1	3.8
	1944	109.5	90.3	53.1	18.9	34.2	97.9	10.7	5.9	5.4
	1945	**149.0**	**83.0**	**47.1**	**10.4**	**36.7**	**80.7**	**4.0**	**8.3**	**5.5**
Allied Chemical and Dye	1939	391.8	236.6	108.1	12.5	95.6	167.9	4.5	21.0	19.9
	1944	336.5	294.1	175.4	35.2	140.2	294.7	274.1	20.6	13.3
	1945	**411.0**	**285.9**	**187.9**	**26.4**	**161.5**	**267.6**	**12.1**	**18.9**	**13.3**
Amer. Agricultural Chemical (1)	1939	12.5	21.5	14.3	0.8	13.5	17.5	0.06	0.7	0.9
	1944	17.6	29.3	20.5	5.6	14.9	33.0	2.9	1.8	1.3
	1945	**26.4**	**30.6**	**21.1**	**6.4**	**14.7**	**34.9**	**2.8**	**1.7**	**1.3**
American Cyanamid	1939	89.0	77.3	39.4	9.0	30.4	..	1.1	5.5	4.2
	1944	105.6	138.9	86.8	31.9	54.9	..	12.0	6.7	3.9
	1945	133.0	**145.3**	**94.1**	**22.2**	**71.9**	..	**2.6**	**6.2**	**3.4**
Atlas Powder	1939	16.0	22.4	9.4	1.3	8.1	16.5	0.3	1.3	0.7
	1944	15.4	36.7	22.9	10.9	12.0	45.0	3.1	1.7	0.8
	1945	**15.4**	**31.7**	**18.3**	**4.4**	**13.9**	**44.4**	**1.9**	**1.4**	**0.8**
Columbian Carbon	1939	49.9	30.6	7.8	1.6	6.2	15.1	0.5	2.8	2.4
	1944	51.1	37.2	13.4	3.4	10.0	23.6	1.8	3.2	2.1
	1945	**64.5**	**37.6**	**14.1**	**3.2**	**10.9**	**27.2**	**1.3**	**3.4**	**2.3**
Commercial Solvents	1939	36.9	20.0	13.8	2.5	11.3	14.4	0.2	1.6	..
	1944	42.2	28.7	19.6	4.1	15.5	65.2	5.9	2.5	1.9
	1945	**65.9**	**26.7**	**21.2**	**2.3**	**18.9**	**104.9**	**4.8**	**2.0**	**2.0**
Davison Chemical (1)	1939	3.5	11.7	6.1	0.3	5.8	9.4	0.01	0.3	
	1944	8.2	15.4	8.7	1.7	7.0	25.4	1.1	1.4	0.5
	1945	**12.9**	**16.4**	**9.5**	**2.0**	**7.5**	**33.4**	**2.2**	**1.5**	**0.5**
Dow Chemical (2)	1939	148.6	41.8	14.3	2.6	11.7	26.7	0.7	4.2	2.9
	1944	152.3	139.6	60.8	23.1	37.7	120.4	14.1	8.6	3.7
	1945	**198.0**	**146.1**	**68.7**	**28.1**	**40.6**	**124.6**	**16.2**	**8.7**	**4.7**
Du Pont (3)	1939	2,013.9	735.8	209.3	47.1	162.2	298.8	14.1	93.2	77.3
	1944	1,721.9	1,170.0	288.5	60.9	227.6	622.1	116.8	80.8	58.3
	1945	**2,060.0**	**1,204.9**	**347.4**	**62.6**	**284.8**	**611.3**	**75.6**	**77.5**	**58.3**
Freeport Sulfur	1939	26.2	23.2	13.1	2.1	11.0	9.0	0.2	2.2	1.2
	1944	27.2	29.8	20.9	4.8	16.1	18.8	1.4	2.6	1.6
	1945	**40.0**	**32.2**	**23.7**	**5.6**	**18.1**	**21.8**	**2.0**	**3.3**	**1.6**
General Aniline (4)	1939	40.7	61.4	33.9	4.4	29.5	25.8	0.7	4.5	1.7
	1944	44.8	70.0	40.2	9.8	30.4	73.3	12.1	3.6	1.5
	1945	**55.8**	**73.6**	**50.1**	**7.9**	**42.2**	**68.7**	**5.8**	**3.7**	**3.2**
Hercules Powder	1939	117.1	49.1	21.7	3.0	18.7	41.0	1.3	5.3	3.7
	1944	109.3	87.8	49.5	19.5	30.0	105.7	11.7	4.8	3.3
	1945	**150.0**	**72.0**	**50.3**	**15.5**	**34.8**	**100.6**	**9.3**	**4.9**	**3.3**
Hooker Electrochemical (5)	1939	2.1	9.9	2.4	0.6	1.8	..	..	0.4	0.1
	1944	10.7	12.7	6.2	1.6	4.6	18.5	3.3	1.3	0.5
	1945	**16.4**	**13.0**	**6.7**	**1.7**	**5.0**	**19.1**	**3.0**	**1.1**	**0.5**
Int'l Minerals and Chemicals (1)	1939	0.8	27.2	6.5	0.4	6.1	11.7	..	0.1	
	1944	8.8	33.6	9.9	1.3	8.6	27.3	0.6	2.0	0.5
	1945	**19.0**	**37.1**	**13.4**	**1.5**	**11.9**	**30.3**	**0.7**	**2.0**	**0.5**
International Salt	1939	8.6	13.5	2.9	0.3	2.6	7.0	0.1	0.5	0.4
	1944	10.6	14.5	4.7	1.7	3.0	10.3	1.6	0.6	0.5
	1945	**13.2**	**15.2**	**5.4**	**3.0**	**2.4**	**11.7**	**2.1**	**0.63**	**0.6**
Mathieson Alkali	1939	24.8	24.8	4.5	0.8	3.7	10.9	0.2	1.1	1.2
	1944	19.8	27.7	11.6	2.4	9.2	18.4	1.1	1.3	0.8
	1945	**26.4**	**28.1**	**12.6**	**2.3**	**10.3**	**19.6**	**1.1**	**1.1**	**0.8**
Monsanto Chemical	1939	135.3	54.7	20.7	5.9	14.8	42.9	1.5	5.4	3.7
	1944	101.4	76.8	31.6	7.9	28.2	87.9	1.6	4.9	2.8
	1945	**148.0**	**79.5**	**43.9**	**7.1**	**36.8**	**95.3**	**1.8**	**5.3**	**2.8**
National Cylinder Gas	1939	12.2	6.9	1.7	0.5	1.2	4.9	0.2	1.0	0.5
	1944	17.3	18.7	8.6	1.7	6.9	24.8	3.7	1.8	1.1
	1945	**24.8**	**18.4**	**8.5**	**1.4**	**7.1**	**21.1**	**2.3**	**1.8**	**1.1**
Newport Industries	1939	8.0	5.6	2.7	0.4	2.3	4.5	0.08	0.4	..
	1944	11.8	6.5	2.9	0.7	2.2	8.8	0.7	0.5	0.5
	1945	**22.4**	**6.6**	**3.5**	**0.8**	**2.7**	**9.7**	**1.1**	**0.63**	**0.5**

TWENTY-NINE CHEMICAL COMPANIES---COMPARISON 1945, 1944 AND 1939

(All figures in millions of $)	Year	Year End: Market Value of Equity	Year End: Total Assets	Year End: Current Assets	Year End: Current Liabilities	Year End: Working Capital	Sales	Federal Taxes	Net Income	Common Dividends
Pennsylvania Salt (1)	1939	25.2	16.7	7.9	0.9	7.0	9.5	0.3	1.3	0.7
	1944	28.5	23.9	10.0	3.4	6.6	26.1	2.3	1.5	1.0
	1945	**31.4**	**24.8**	**11.9**	**4.1**	**7.8**	**26.2**	**2.0**	**1.4**	**1.0**
Sylvania Industrial	1939	10.6	11.6	3.0	0.9	2.1	..	0.4	1.3	0.5
	1944	14.9	15.1	8.5	1.7	6.8	..	0.7	0.8	0.6
	1945	**16.6**	**15.4**	**9.5**	**1.9**	**7.6**	..	**0.75**	**0.9**	**0.6**
Texas Gulf Sulphur	1939	126.7	61.9	30.5	2.1	28.4	20.8	1.1	7.8	7.7
	1944	138.2	67.9	41.7	8.9	32.8	32.5	7.1	9.6	9.6
	1945	**188.0**	**69.0**	**45.8**	**9.4**	**36.3**	**34.0**	**8.0**	**10.0**	**9.6**
Union Carbide & Carbon	1939	807.1	336.8	133.4	22.6	110.8	170.3	6.6	35.8	18.3
	1944	742.2	481.2	290.4	128.4	162.0	507.0	83.3	37.7	27.8
	1945	**937.0**	**428.1**	**281.6**	**92.7**	**188.9**	**480.0**	**58.3**	**37.9**	**27.8**
United Carbon	1939	23.8	16.4	3.6	0.8	2.8	8.5	0.4	1.5	1.2
	1944	26.2	20.6	5.6	1.9	3.7	13.5	1.1	2.2	1.2
	1945	**32.6**	**21.7**	**4.9**	**1.5**	**3.4**	**14.4**	**0.51**	**2.3**	**1.2**
U. S. Industrial Chemicals (6)	1939	8.9	13.8	9.8	2.3	7.5	11.9	..	0.08	..
	1944	14.7	32.4	18.2	7.1	11.1	37.5	1.7	1.7	0.8
	1945	**20.0**	**32.7**	**18.6**	**6.7**	**11.9**	**40.5**	**1.7**	**1.7**	**0.8**
Victor Chemical Works	1939	20.8	8.7	3.6	0.8	2.8	8.3	0.2	1.1	0.9
	1944	18.7	11.0	6.4	0.8	5.6	14.9	1.7	1.1	0.8
	1945	**30.7**	**11.9**	**7.6**	**1.2**	**6.4**	**16.5**	**2.1**	**1.1**	**0.8**
Virginia-Carolina Chemical (1)	1939	1.9	25.5	10.8	1.6	9.2	16.8	0.08	0.5	..
	1944	1.9	30.7	18.0	3.5	14.5	29.3	2.1	0.8	..
	1945	**1.9**	**33.4**	**18.7**	**3.5**	**15.2**	**33.4**	**1.8**	**1.0**	
Westvaco Chlorine	1939	12.5	13.1	3.9	0.6	3.3	10.8	0.3	1.3	0.6
	1944	9.9	18.5	9.6	0.9	8.7	18.4	0.4	1.0	0.5
	1945	**13.8**	**18.3**	**9.4**	**0.8**	**8.6**	**17.9**	**0.6**	**1.0**	**0.5**

(1) Year or year ended June 30.
(2) Year or year ended May 31.
(3) See column at right.
(4) Equity value is represented by 527,665 "A" shares outstanding at the end of 1945, 527,667 in 1944 and 529,693 in 1939.
(5) Year or year ended Nov. 30.
(6) In 1945 and 1944 data are for year ended March 31 except value of equity.

(3) The value of Du Pont's investment of 10,000,000 shares of General Motors common stock and the income derived therefrom was as follows:

	Stated Value Dec. 31	Income Received
1939	$197,000,000	$35,000,000
1944	247,000,000	30,000,000
1945	254,000,000	30,000,000

figure was still one and one-half times greater than the 1939 figure. But although the ratio of current assets to current liabilities was 4.3 to 1 at the end of 1945 compared to 5.6 to 1 at the end of 1939, the industry still finds itself in excellent financial position. All U. S. corporations at the end of September 145 showed a 2 to 1 current asset-current liability ratio.

At the end of last year the twenty-nine chemical companies had aggregate working capital of $1.1 billion, a considerable increase over the $627 million total at the end of 1939. As is the case with all other industries, it is to be expected that a large portion of their working capital will be needed for the rehabilitation and expansion of plant, equipment and inventories.

NET INCOME

Since the high war tax rates were in effect for the full year 1945, it was not possible for the chemical companies to show any material increase in their net income. Last year the twenty-nine com-

(Turn to page 861)

Table II—Summary of Principal Financial Data of 29 Chemical Companies for the Years 1939, 1944, 1945

(Dollar Figures in Millions)

Year	Year End: Market Value of Equity	Year End: Total Assets	Year End: Current Assets	Year End: Current Liabilities	Year End: Working Capital	Year End: Net Worth	% Earned On Net Worth	Sales	Federal Taxes	Net Income	Common Dividends
1939	$4,323.0	$2,030.0	$759.1	$132.1	$627.0	$1,671.5	11.9%	$1,009.8	$36.1	$198.5	$155.1
1944	3,917.7	3,059.6	1,348.7	403.7	945.0	..	..	2,400.3	327.2	210.4	146.6
1945	4,924.1	3,039.2	1,455.5	336.6	1,118.9	2,091.7	10.1	2,389.8	228.4	211.3	149.8
% change 1939 to 1945	+14	+50	+92	+155	+77	+25	...	140	+532	+6	−3

Note: Sales exclude American Cyanamid and Sylvania Industrial which do not report these figures. Hooker Electro-chemical sales figures for 1939 unreported.

Table III—Indicated Potential Earnings of 29 Chemical Companies

	Federal Taxes: Millions	Federal Taxes: % of Net Worth	Net Income Before Federal Taxes: Millions	Net Income Before Federal Taxes: % of Net Worth	Net Income After Federal Taxes: Millions	Net Income After Federal Taxes: % of Net Worth
1939	$36.1	2.2	234.6	14.1	198.5	11.9
1945	228.4	10.9	439.7	21.0	211.3	10.1
1945*	167.0	8.0	439.7	21.0	272.7	13.1

* If 38% corporate income tax rate (which is the rate effective in 1946) had been applied to 1945 reported net income before taxes.

GEL LACQUERS Provide New COATING METHOD

A WAY TO APPLY A DURABLE "PLASTIC VENEER" by dipping articles in a gel-forming cellulose-ester lacquer was described before the American Chemical Society last month by C. J. Malm and H. L. Smith, Jr., of the Eastman Kodak Company. Coatings can be obtained ten times as thick as by ordinary dipping methods, giving the appearance of solid plastic.

GELATION of lacquer at a temperature intermediate between dipping temperature and room temperature to give a heavy uniform coating is the basic characteristic of a new application method described to the Division of Paint, Varnish, and Plastics Chemistry, at the recent ACS meeting, by C. J. Malm and H. L. Smith, Jr., Eastman Kodak Co.

Using cellulose acetate-butyrate in a mixture of solvents blended to give the desired viscosity and gel point, they discovered that it is possible to produce hard, tough protective coatings, on articles which lend themselves to dipping, more quickly and with a coat much thicker than can be obtained with ordinary lacquers.

The coating thus obtained is in reality a plastic veneer. A wooden, metal, or paper article so coated looks and feels like solid plastic; and surface imperfections of the core material are effectively hidden. Moreover, it gives a decorative finish to articles molded from plastic scrap of assorted colors or from low-pressure laminates.

The resulting objects are comparable to those made by injection molding of a thermoplastic material around a core, but the new method is more economical of material (requiring only about a third as much) and eliminates the necessity of molds.

Quoting from the paper presented at the meeting:

COMPOSITION OF THE LACQUER

At elevated temperatures, the lacquer[1] is a smooth, flowable, though viscous, liquid. On cooling to room temperature, however, it sets immediately to a firm, non-flowable gel, maintaining the applied coating in its original form without sagging or wrinkling. This gelation occurs with temperature change alone and is not dependent on solvent evaporation, though the latter normally accelerates setting.

The method has been successfully employed using a variety of cellulose acetate-propionate and acetate-butyrate esters. One of the most successful esters for gel lacquer has been found to be the cellulose acetate-butyrate containing approximately 13 per cent acetyl and 37 per cent butyryl. This ester is available commercially as such or in a plastic molding compound under the trade name "Tenite II."

A hydrocarbon, usually a commercial grade of toluene or xylene or a mixture of these two, and an alcohol, usually anhydrous isopropanol, are mixed to produce a suitable solvent.

HOW IT IS APPLIED

In brief, the process consists of dissolving the ester or the molding compound in a carefully balanced solvent combination at a temperature of 140°-150° F. If the ester is used, any desired plasticizer and pigment may be incorporated at this point, or one may dissolve Tenite II molding granules directly, thus obtaining film former, plasticizer and pigment in a thoroughly dispersed state. When solution is complete, the temperature is dropped to approximately 120° F. and bubbles allowed to escape, and the lacquer is ready for use. Articles are coated by a simple dipping operation, being withdrawn slowly, inverted, and set to dry. The smooth, heavy coating thereby deposited sets almost immediately to a firm, non-flowing gel on being exposed to room temperature, preserving the original contour of the applied coating. This setting to a tack-free, non-flowable coat occurs in a minute or so and at the end of 15 to 20 minutes the film is sufficiently hard to withstand normal handling. Final complete curing of the lacquer takes considerably longer and is accompanied by shrinking of the gelled film as the solvent evaporates.

This technique has numerous advantages over the customary methods of dip lacquering. The most obvious is the thickness of coating deposited—up to 0.015" of dried lacquer per dip, as compared to

[1] U. S. Patent #2,324,098, Malm and Clarke; #2,350,742, #2,350,743, #2,350,744, Fordyce and Clarke

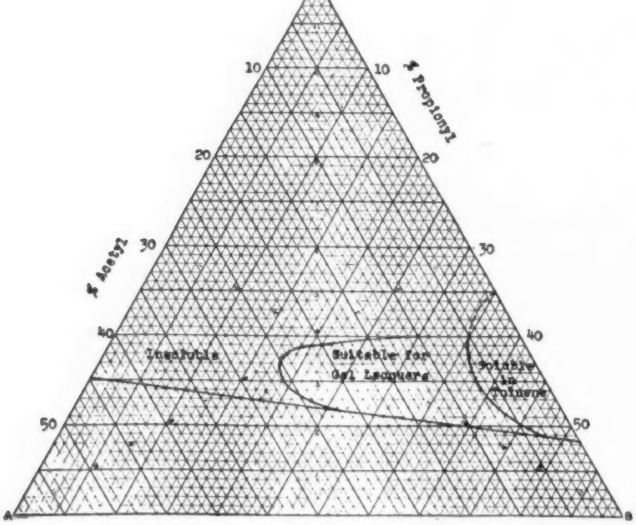


Fig. 1-A. Cellulose acetate-propionates suitable for gel lacquers in toluene-alcohol.

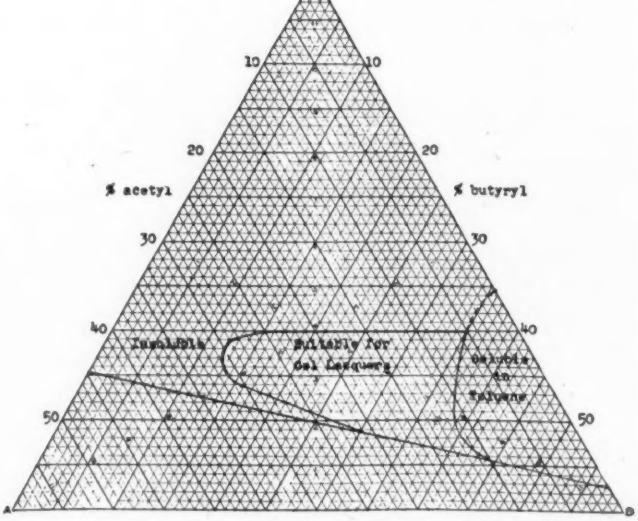


Fig. 1-B. Cellulose acetate-butyrates suitable for gel lacquers in same solvent combination.

the usual 0.001-0.002" (Figure 2). The coating has all the appearance and feel of a solid plastic article, since the heavy deposit completely hides the core material, removing any characteristic grain, such as that in wood, and changing the heat conductivity of the surface to that customarily associated with a plastic.

If the core material is pre-cooled to about 40° F. prior to dipping in the gel lacquer, it is possible to obtain coatings about twice as heavy as with the normal technique.

On the debit side, the gel lacquer coatings have no adhesion to any of the customary core materials unless a suitable primer is used. They shrink considerably on drying and hence tend to pull away from sharp interior angles. The shrinking, of course, helps adhesion where the coating can shrink around the article being dipped.

The coating applied by gel lacquering is smooth, glossy, and highly decorative, with low heat conductivity which gives it a plastic feel. It is also a good electrical insulator. The impact resistance is high and its durability excellent, both properties being comparable to those exhibited by molded cellulose acetate-butyrate plastic articles. The coating is quite resistant to liquid water but its water vapor permeability is not low enough to make it a really good film for moisture vapor protection.

APPLICATIONS

Possible uses of this material are numerous. In general, it can be used on suitably shaped articles wherever a premium finish offering excellent appearance, good protection and permanence is desired. Specifically, some possible applications might be as follows: Where wooden cores are to be used, tool handles, kitchen utensils, baby furniture and toys, toilet seats, shoe heels and the like suggest themselves. Any applications now done by the nitrate sheet covering process can be done more simply by this method, as well as much more safely. In the field of metal cores, tool handles are an excellent place for the use of gel lacquer; particularly for electricians' tools is the added insulating power of the coating desirable. Any use where the strength of metal but the appearance and feel of a plastic are desired is a natural outlet, such as an airplane control wheel. Paper can be used for a core and the gel lacquer imparts considerable strength, as well as good appearance. It can be used with glass containers to produce shatterproof and spillproof bottles, as well as for decorative effects. It can also be used to give a decorative finish to articles molded from cheap scrap plastic or to low pressure laminates.

Indeed, this phenomenon of temperature gelation of a lacquer made from a high viscosity film former opens up many new and interesting fields in protective coatings.

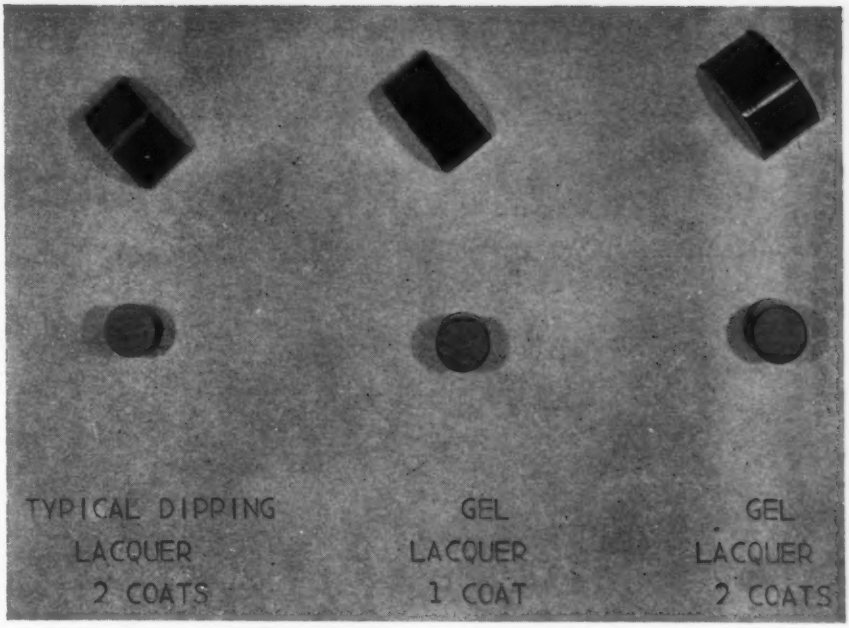


Fig. II. Comparison of gel lacquer with typical dipping lacquers.

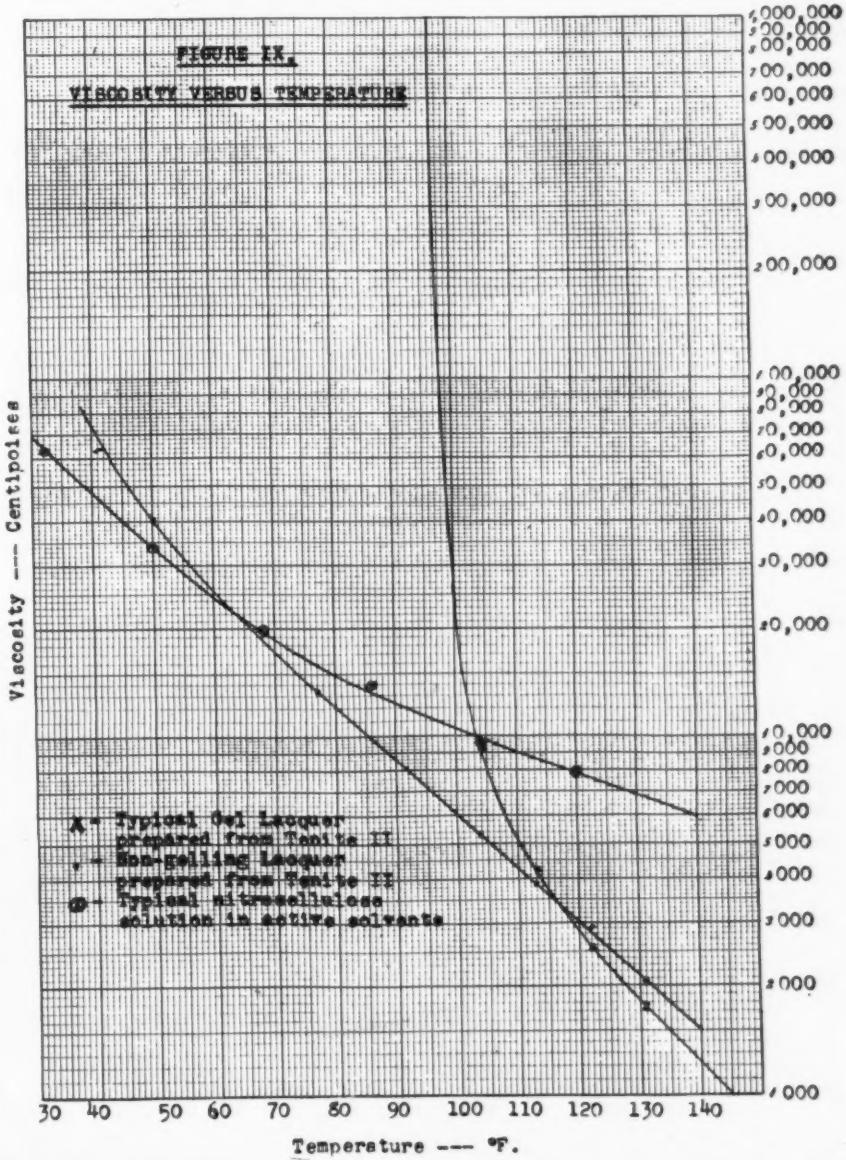


FIGURE IX.
VISCOSITY VERSUS TEMPERATURE
Viscosity --- Centipoises
Temperature --- °F.
30 40 50 60 70 80 90 100 110 120 130 140
X- Typical Gel Lacquer prepared from Tenite II
• - Non-Gelling Lacquer prepared from Tenite II
@- Typical nitrocellulose solution in active solvents

Fig. III. Viscosity-temperature curve for gel lacquer compared with non-gelling lacquers clearly shows unique character of the former.

Recent Advances in ALCOHOL DISTILLATION METHODS

by EARL D. UNGER, Research Engineer
Joseph E. Seagram and Sons, Inc., Louisville, Ky.

RESEARCH ON THE MANUFACTURE of alcoholic beverages has reduced the formation of undesirable flavoring materials in the beer still by use of the respray principle at reduced temperature and pressure, while extractive distillation has improved the removal of fusel oils in the hi-wines distillation.

TODAY, the beverage distilling industry finds itself passing from the stage of an ancient art into a modern, precise science. After repeal, operation was almost entirely batchwise; automatic control was non-existent; and processes were guided by rule-of-thumb methods. In the most progressive companies in the field, the impact of the engineering and bacteriological sciences was quickly felt.

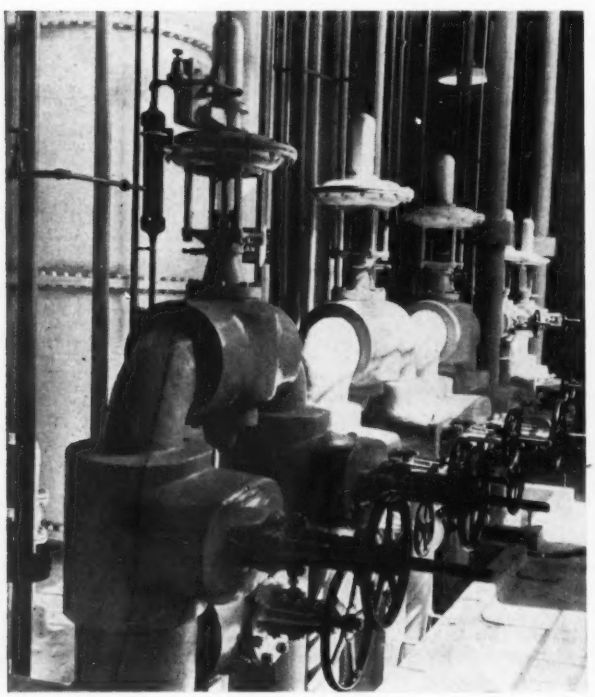
Nowhere is this trend better illustrated than in the distillation process. In order to obtain the quality, uniformity and quantity of product desired, Seagram, in cooperation with distillation equipment manufacturers, has developed multi-column units which are outstanding examples of engineering skill and efficiency.

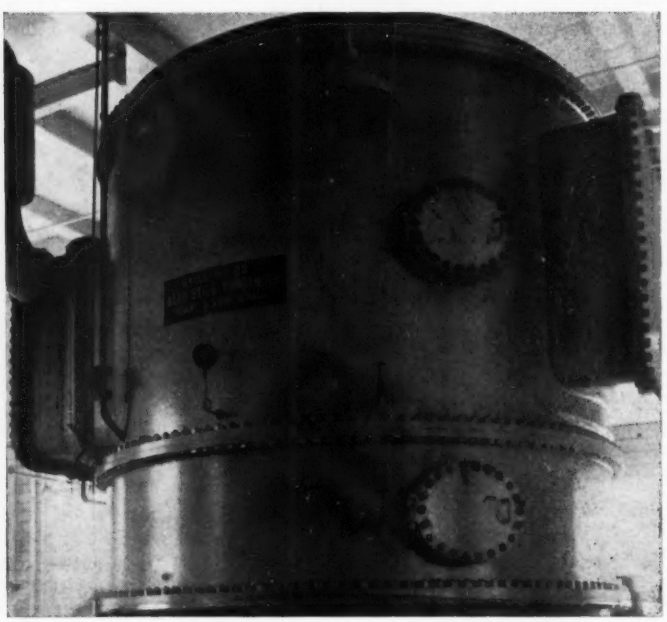
BEER STILLS

The first step in the distillation process is the separation of the volatile constituents in the fermented mash—ethyl alcohol, esters, aldehydes, acids, and fusel oil and some of the water—from the grain solids. This operation is carried out in a beer still. The usual equipment in the distilling industry to perform this separation is a column equipped with 18-20 sieve plates operating at atmospheric pressure. The distillate (hi-wine) from this type of unit possesses a peculiarly unpleasant and objectionable flavor and aroma.

Numerous patents have been issued covering treatment of this hi-wine by activated carbon or by chemical methods. Prevention, however, is better than cure, and careful laboratory studies revealed that this undesirable flavor was caused by thermal decomposition of yeast and grain during distillation. The answer was then obvious—distill the fermented mash (beer) under vacuum at low temperatures. Further laboratory tests demonstrated that it was necessary to carry out the beer distillation at 95°-100° F. in order to achieve the best quality of product. At these temperatures, decomposition of yeast is eliminated, and living yeast cells are discharged from the base of the still.

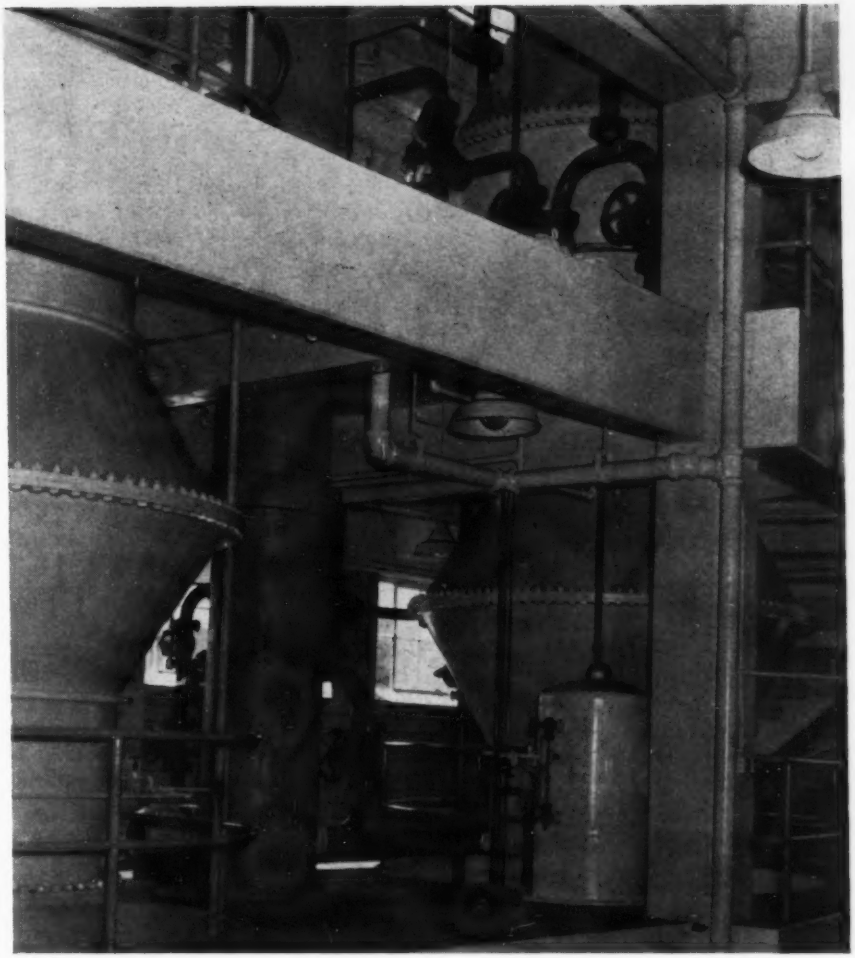
The problem of designing beer stills to operate at these low temperatures was quite complex. Conventional sieve plate stills have a high pressure drop; even with a high vacuum at the top, the lowest base temperature attainable is 125° F. To overcome this difficulty, an entirely new type of beer still was developed on a pilot plant scale. This unit consisted of a column packed with cypress grids. The beer was introduced into the still as a spray over the top surface of the grids. Steam entered the base and passed upward through the grids. This unit proved that beer could be stripped of its alcoholic content at a temperature not exceeding 100° F. Two large plant units have been constructed and are now in operation using this principle of beer distillation. But the march of progress





A steam and water control station in the still house is shown at the left, while a beer still condenser is pictured below.

is endless. The wooden packing is undesirable from a construction and operating viewpoint, and so this packing was eliminated. Two additional beer stills were built which depend entirely upon the use of a series of seven sprays and alternate collector plates to redistribute the beer and contact it with the steam. Units, designed and fabricated by Vulcan Copper and Supply Co., operate with a pressure drop of 10 mm. Hg. or less. It is readily possible to achieve base temperatures of 95°-100° F. The superior quality of the distillate is good evidence of the value of this process.



Undesirable flavors, introduced into the alcohol by decomposition of yeast and grain in the beer still, are minimized by carrying out the distillation at reduced temperature and pressure. The stills used are of a special design and are based on the respray principle. The above picture shows the "Mae West" contour of two of these stills. This design is used in order to make the shape of the still body conform to the shape of the spray cone.

HI-WINE STILLS

The next step in the distillation process is to convert the hi-wines into pure neutral spirits—the constant boiling mixture of ethyl alcohol and water. The impurities to be removed constitute only 0.8% or less of the weight of ethyl alcohol. They consist of the following constituents:

Fusel Oils	0.70%
Esters	0.006%
Aldehydes	0.004%
Acids	0.030%

In addition, there undoubtedly are numerous other classes of compounds present in only micro amounts which nevertheless contribute very greatly to the odor and taste characteristics. A good grade of neutral spirits will contain less than 0.0025% of total impurities, but chemical analysis in its present state of development is an unreliable method for evaluating quality. Carefully controlled odor and taste techniques have been developed by the Seagram laboratories which by statistical analysis of the observers' judgments constitute the most reliable and precise method of evaluating quality.

The most common system for converting hi-wine into spirits consists of a three-column unit—an aldehyde or purifying column to remove the low boiling impurities such as aldehydes and ethyl acetate, a fusel oil column to remove fusel oils and high boiling esters, and a rectifying column to remove acids, further remove the above impurities, and to concentrate the alcohol to 190-194° proof. Operating experience with this type of unit has proven it inadequate to achieve the desired purity of neutral spirits.

The above system is unsatisfactory because the rectifying column carries too much of the purification burden. The function of a rectifying column should be solely that of cencentration of alcohol. To attain this objective, equipment manufacturers have developed the "hydroselector principle" for removing these impurities. Basically, this process is an extractive distillation employing hot water as the solvent which carries the ethyl alcohol out the base of the column while permitting the relatively immiscible esters and fusel oils and the very volatile aldehydes to distill out the top. By regulating the amount of solvent (water) to dilute the alcohol out the base to 90° proof, it is possible to remove 80%-95% of the aldehydes, esters, and fusel oils. This dilute alcohol can then be further processed in a conventional purifying column to remove the remaining congeners.

With these two columns in series, the rectifying column is almost completely relieved of the burden of purification. All that remains are the acids (such as acetic acid) which are very readily removed by fractionation, and traces of aldehydes, esters, and fusel oil. The primary function of the rectifying column is to concentrate the alcohol, and for this purpose, sufficient plates are provided to attain the azeotrope concentration—194° proof. Although 30 concentrating plates would be sufficient to attain 190-192° proof, the use of double this number insures greater uniformity and better quality of neutral spirits.

The fusel oils and high boiling esters are removed in a conventional fusel oil column and decanter system. But here again, it is important to employ a sufficient number of rectifying or concentrating plates so that none of the fusel oil is withdrawn from the top of the column and recycled to the system. Another very important consideration is control of the fusel oil band—the point at which fusel oil is drawn off to the decanter. Experimental work has shown that this oil band concentrates at the 140° proof range.

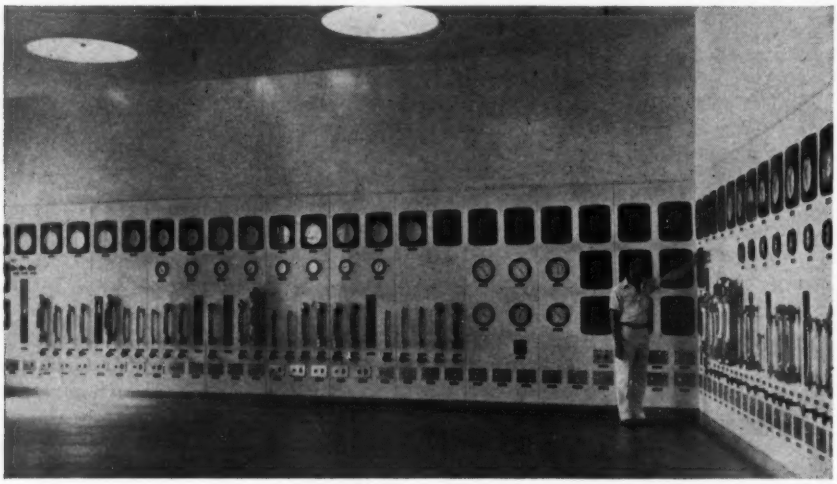
"HEADS" CONCENTRATION

The separation of the low boiling impurities (heads) in the distillation system is another outstanding development in the industry. Federal regulations require that these heads impurities contain at least 0.5% acetaldehyde before they can be discarded without payment of tax.

The conventional purifying column cannot effect this degree of concentration. The usual procedure for processing these heads is to withdraw a stream from the top of the purifying column equivalent to 5-10% of the product. This material is chemically treated and is then redistilled in a separate batch still taking heads and tail cuts and yielding a second-class grade of spirit.

The Seagram process consists of feeding this heads stream into a continuous 75-plate distilling column. Here the heads, concentrated to 1-2% acetaldehyde and 10-20% ethyl acetate, are withdrawn at the top in a stream equivalent to only

0.1% of the total product. This material is discarded since it is unfit for any beverage purpose. The alcohol is withdrawn from the base of this column practically free of impurities and is recycled to the main system. In this manner, practically all of the alcohol in the beer is converted into high quality spirit and the storage, chemical treatment and time-consuming batch distillation are not necessary.



The impact of engineering advances on alcohol distillation processes is perhaps most graphically displayed by the battery of indicating and control instruments in the distillation control room of the Seagram's plant at Lawrenceburg, Ind.

THE STILL HOUSE

All of these developments have been applied to plant operations. A visit to the still house of Joseph E. Seagram & Sons, Inc., Lawrenceburg, Indiana, graphically reveals how this has been done. Here two units have recently been installed—one capable of treating 2,000 bushels of grain per day capacity; the other for 3,000 bushels per day. Both have been designed and fabricated by the Vulcan Copper & Supply Co.

THE CONTROL ROOM

Operation of these systems is carried out in a central control room. Here all pressures, vacuums, temperatures, distillate concentrations, and flows of water, steam, and material in process are recorded and controlled. Beer feed flow and steam flows are regulated automatically. Vacuum is regulated by absolute pressure controllers. The flow of all overhead streams is controlled by column middle temperature. Condenser water flows are regulated by exit water temperature. Other flows are regulated or measured by level controllers or by rotameter adjustments.

STILL AREA

Stepping through the control room, we enter the still area. Let us follow the process of the 3,000 bushel unit as a typical example. This unit consists of the following columns:

1. Vacuum Beer Still—7 spray sections—to separate volatile components from the grain.
2. Oil Stripping Column—33 plates—to remove the major load of fusel oils, esters, and aldehydes.
3. Purifying Column—55 plates—to remove the remaining fusel oils, esters, and aldehydes.
4. Rectifying Column—75 plates—to produce the most neutral grade of spirits and whiskey obtainable in a commercial unit.
5. Fusel Oil Column—55 plates and decanter—to separate fusel oils and high boiling esters.
6. Aldehyde Column—75 plates—to remove aldehydes, ethyl acetate, and the low boiling impurities in a concentrated form.

The vacuum beer still, based upon the respray principle, is most striking in design. Its "Mae West" contour is designed to conform to the shape of the spray cone pattern. The condenser is mounted within the shell so that pressure drop is minimized as much as possible. In order to condense the alcohol vapor at the low operating temperature, it is necessary to spray water over the condenser tubes to dilute the product to approximately 30° proof. The beer feed is sprayed into the column by solid cone spray nozzles.

The oil stripping column operates on the "hydroselector" or "extractive distillation" principle outlined previously. Water which is used as the solvent is obtained from the base of the rectifying column at the boiling point. It is interesting to note that the overhead distillate contains the majority of the fusel oils which are the high boiling components in the feed, while the low boiling component ethyl alcohol is discharged from the base. This is a complete reversal of the normal distilling tendency.

The remaining columns—purifying, fusel oil, aldehyde and rectifying—are normal in design and operation except that they are provided with an adequate number of plates to give a uniform quality of product or a high concentration of impurities as the case might be.

UTILITIES REQUIREMENTS

For this type of system, water, steam and electrical requirements are high, but this is a relatively small consideration when spirit and whiskey quality and uniformity are the primary considerations. Below are listed these utility requirements for the 3,000 bushel per day unit.

Steam—25,000 pounds per hour at 10 lbs. gauge pressure.

Condensing Water—3,000 gallons per minute at 56° F.

Electric Motors—115 horsepower.

However, several noteworthy water and steam economies are obtained in this unit. The beer still condenser water, which is discharged at approximately 65° F., is reused for cooling purposes in the other condensers and in other parts of the distillery. Water for dilution purposes in the beer still, oil stripping column and fusel oil column is obtained from the base of the rectifying column. The Vulcan vapor re-use process is applied to good advantage in this unit. The alcohol vapors from the purifying and rectifying columns are used for generating steam under vacuum for operation of the beer still. About 70-75% of the steam required for the beer still is supplied in this way.

A LOOK INTO THE FUTURE

These units represent the highest degree of technical development in the production of neutral, uniform spirit and whiskey distillates. However, they are largely research tools for the study of even better process operation and instrumental control. Laboratory and plant experimentation continue to reveal new processes which far outstrip these reported here in the production of a product in which quality and uniformity are the prime considerations. And these, in turn, will serve as guides to further progress.

German Production of Tetranitromethane

EXCELLENT yields of pure tetranitromethane are claimed for a new process which involves the continuous nitration of acetylene. The production of this material, an explosive of high detonating power, was carried out on a laboratory scale at the plant of the I. G. Farbenindustrie A. G. at Hoechst.

Results were such that the Germans planned to build a pilot plant capable of producing 30-50 tons per month. The following uses have been suggested for the material: (1) as an addition to Diesel fuels; (2) in admixture with hydrocarbons for improved explosives; (3) as a raw material for the production of trinitromethane; (4) as a technical means of nitration.

TEFLON

New "Noble Metal" of the Plastics

PRODUCTION FOR WAR USES OF TEFLON, Du Pont's tetrafluoroethylene polymer, was started in 1943. It is tough; it has excellent electrical properties; it is extremely resistant to heat; and its chemical inertness is unequalled by any other plastic.

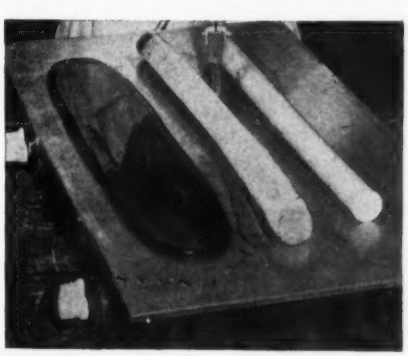
THE DISCOVERY of Teflon is said to have taken place in the course of refrigerant research by Kinetic Chemicals, Inc., a partially owned subsidiary of the du Pont Company. The gaseous monomer, which boils at —78° C., was prepared as an intermediate and stored temporarily in a steel cylinder. Later, when the gas was used, it was noticed that only a third or so of the material was released before the pressure fell to zero, and the tare weight of the cylinder was high. Sensing what might have happened, the research men cut the cylinder open and found the insoluble, infusible white powder which was the first Teflon.

From the chemical composition and physical nature of the polymer, it was immediately obvious that the substance might find useful and unique applications in the field of plastics; and consequently, a patent was applied for and obtained (U. S. Patent No. 2,230,654: *see* CHEMICAL INDUSTRIES, March 1941, p. 387). Following this, development of the plastic was taken over by the Plastics Department at Arlington, N. J.

Pilot-plant production was undertaken in 1943 for war uses under strictest secrecy. It is still only in the pilot plant, but it is available for evaluation.

APPEARANCE AND PROPERTIES

Teflon in thin sections is transparent, but in thicker pieces it is waxy in appearance and white or gray in color.



Teflon is untouched by a temperature of 200°C. Other plastics have lost shape.

Properties, upon which many important uses will be based, are its toughness over a wide range of temperatures, its excellent electrical properties over a wide range of frequencies, its extreme chemical inertness, and its high heat-resistance.

Teflon has no true melting point, but it undergoes a solid-phase transition to a gel at 325° C. with a sharp drop in strength. In the neighborhood of 400° C. it decomposes slowly to yield the gaseous monomer plus a few other gaseous fluorine derivatives. Small amounts of fluorine-containing gases are given off at temperatures above 215° C.

The chemical resistance of Teflon is outstanding, in that it withstands the attack of all materials except molten alkali metals. It can be boiled in aqua regia, hydrofluoric acid, or fuming nitric acid with no change in weight or in properties. It also resists the attack of organic materials and strong alkalies. Since it can be used over the temperature range of —75° C. to 250° C., immediate uses for it as a gasket and packing material and as tubing for chemical process work are suggested.

Until now, no successful plasticizer has been found for the material. At high temperatures, where Teflon finds its special niche, plasticizing materials would volatilize out.

The excellent electrical properties of Teflon, coupled with its heat-stability, give it many potential applications in the power field, where one of the limiting features in design of electrical equipment has been the lack of a suitable insulating material that will withstand high temperatures.

METHODS OF WORKING

Teflon can be extruded in the form of rods and tubes or as a wire-coating, and compression moldings of simple articles can be made by using special techniques. Sheets and thin films are made by shaving baked blocks and cylinders.

Rods and tubes of Teflon are extruded in continuous lengths by screw stuffers of the conventional type, although special techniques are required. Extrusion rates vary, but all of them are measured in terms of feet per hour, which is slow when compared to those of other thermoplastics.

Until molding techniques are more fully developed, it is necessary to form articles of complicated shapes by machining some of the standard shapes of Teflon that are now available. Teflon can be machined very easily with standard wood-working or metal-working tools as long as they are kept sharp. Sheet stock can also be worked on a punch press. Thin-walled tubing can be flared by standard flaring tools that are used for copper tubing, and heavy tubing can be threaded by standard pipe-threaders.

PROSPECTS

The field for Teflon will always be limited. For applications which can take advantage of its unique properties, however, it is bound to find a ready, but special, market. Foremost, perhaps, among these uses are in the manufacture of electronic parts subject to high frequency current and high temperature. Its only near competitor is the silicone group of resins, which are similar to Teflon in their resistance to heat and electrical energy.

Present production is in the neighborhood of 10,000 lbs. per month, and the price is from $12-$15 per lb. It is expected that large-scale plant production may bring the price down to $2.50 per lb., but even then it probably will not compete with present, cheaper resins except for the aforementioned special purposes. The patent situation is said to be clear. Loosely comparable prior patents have been granted in Germany, but they do not conflict.

Meanwhile, development is in progress to extend Teflon's usefulness. Organic fillers have been added successfully; dip-coating methods may prove feasible; and modifications are being studied in order to provide materials which can be molded on injection and compression machines with little difficulty.

Registration at Convention Hall

Peacetime Applications of War Advances Discussed at ACS Convention

EDITORIAL STAFF REPORT

THE FIRST POSTWAR NATIONAL MEETING of the American Chemical Society convened at Atlantic City, N. J., April 8 to 12. Heilbron received the Priestley Medal . . . Parsons was honored for his long service . . . Secretary of War Patterson told of chemists' place in national defense . . . Papers on nuclear energy and antimalarials . . . Major emphasis on high polymers.

THE ENHANCED significance of chemistry, and of natural science in general, in the world today was pointed out by speakers at the 109th meeting of the American Chemical Society in Atlantic City, N. J., April 8-12.

That this significance is not an unmixed blessing was implied by Secretary of War Robert P. Patterson in his reasons for defeating Germany first: "The reason that seemed to me as compelling as any was the danger of the German scientists, the risk that they would come up with new weapons of devastating destructiveness. There was no time to lose in eliminating German science from the war."

Although chemistry and the other sciences have made war more frightful, it is that very frightfulness which gives the Secretary of War hope: "If we succeed in banishing war, success will be due to the consciousness of all nations that the weapons that science can devise would result in mass destruction affecting all concerned, on a scale infinitely greater than any in our experience to date."

Moreover, Patterson continued, many of the counter measures devised by science will result in peacetime benefits for mankind. "It is a seemingly irrational commentary on human achievements to note that some of our greatest blessings have been the product of war. The recent conflict [is] no exception, and the great crop of military developments of World War II must be recognized as containing inherent benefactions which their martial purpose had concealed."

Among these life-saving agents with peacetime medical uses he mentions antilewisite, which counteracts arsenic and mercury poisoning; the "nitrogen mustards," which have shown effectiveness against cancer; diisopropyl fluorophosphate, which has been found beneficial in treatment of the eye condition, glaucoma, and a muscular disease, myasthenia; a treatment for cyanide poisoning; and the new rodenticide, 1080.

In the biological sciences, he went on, military discoveries will aid humans, animals, and agriculture. Among these discoveries are a new toxoid for ptomaine, a new vaccine for rinderpest, new weed killers, and new techniques in mass production and detection of, and protection against, pathogenic microorganisms.

IMPACT ON ARMY

The contributions of science to warfare have had a profound effect on military thinking, according to the Secretary. "The Army, I assure you, is 'invention minded' from the top command down. If any of you, in your dealings with the soldiers, have encountered a 'stickiness' in the past, you will have to search hard to find any trace of it in the future. What you will find will be an organization . . . that is committed to the policy that future planning must involve the concept of a steady partnership of the military, science and industry."

The Secretary then outlined the long-range program of the War Department to augment the number of scientifically trained Army personnel. This program is

aimed, not for self-sufficiency, but to provide men for key positions in military research and to strengthen contact with science and technology. Three measures are involved: (1) commissioning of promising graduates of advanced technical schools and universities; (2) sending young officers of demonstrated aptitude to such schools for post-graduate studies in basic science; and (3) offering greater inducement to civilian scientists to take permanent employment with the War Department. "This program will succeed only if more adequate recognition by way of rank and prospects of promotion is extended to those who devote their careers to research and development, and such recognition will be given."

SCIENTISTS IN POLITICS

The president of the Society, Colonel Bradley Dewey, agreed with Patterson in the hope that science has made warfare too destructive to tempt nations to engage in it. "But this can only come if peace-loving countries are prepared to see to it that no new outlaw nation is allowed to practice international banditry. Science must help this preparedness."

Citing the contributions of science to the recent war, Dewey pointed out that the scientists who developed these will also be foremost in adapting them to peacetime pursuits. This is especially true of atomic energy, the release of which has placed new responsibilities upon the scientist, "increasing his obligation to stress the importance of science to social progress and the power of science to add to the dignity of the human spirit." It is particularly important, he declared, for scientists to maintain their equilibrium amid the confusion caused by the atomic bombs.

"To a certain extent scientists have added to this confusion of tongues and have somehow succeeded in creating the impression that they have all the answers, even in the field of politics, national and international. In so doing, some have forgotten that national leadership is only won by long, self-sacrificing public service."

ATOMIC ENERGY

The Society itself made a statement on current proposals to control atomic energy through Charles A. Thomas, a member of the Society board of directors and of the Secretary of State's Committee on Atomic Energy. It generally concurred with the principle of international control at such time that it becomes feasible but pointed out that national legislation may be enacted before the international problem is resolved. "The Society strongly recommends that the over-all supervision of atomic energy research and development provided for in such legislation shall be placed in the hands of a civilian commission. The members of this commission should be carefully chosen for integrity and statesmanship. Our nation's best qualified scientists should be included in the commission."

The Society, in its statement, recognizes the necessity of withholding publication of certain phases of the work, and of keeping in touch with the military to that end. But it would relegate the military to a purely advisory capacity.

Glenn T. Seaborg, co-discoverer of plutonium, warned that the "denaturing" of explosive radioactive substances cannot prevent their conversion into materials suitable for bombs. He asserted that commercial applications of atomic energy may have to be banned altogether, to prevent diversion of the material to destructive purposes, unless effective international control of fissile material is established.

"Under any circumstances, we can say with certainty that this development will affect the lives of every one of us and the importance of the problems which it raises cannot be over-emphasized."

He asserted that industrial atomic energy would have a place at any price, for it can do things no other form of energy can do; but it seems that nuclear fission will eventually be able to compete with present sources, even on a cost basis.

In order that these benefits may be realized, Seaborg urges the adoption of the report to the State Department of the Lilienthal Board of Consultants, proposing an "Atomic Development Authority."

PRIESTLEY MEDAL TO HEILBRON

Sir Ian Morris Heilbron, Scottish-born professor of organic chemistry in the Imperial College of Science and Technology, University of London, world-renowned for his contributions to penicillin and vitamin research, received the Priestley Medal, highest honor in American chemistry, at the opening meeting.

In his medal address, where he reviewed the progress during the past twenty years in his particular fields, he looked to a future marked by increasing collaboration of the world's scientists: "Gone are the days of Priestley and Faraday, who with little or no assistance could carry out highly significant experiments. Almost all of our major chemical problems now require the coordinated efforts of research teams, in which each individual forges an important link."

Extrapolating this argument, he continued, "The full development of science makes even wider demands, a free collaborative spirit overriding all artificial barriers of nationality, race and religion."

OTHER HONORS

Recently retired Secretary of the Society Charles L. Parsons was honored for his 38 years' service in that capacity at a dinner Wednesday evening. He was presented with a gold medal and a bound volume of letters from several hundred chemists eulogizing his contributions to the welfare of science and industry. Professor Marston T. Bogert, of Columbia University, was toastmaster. Speakers included Harold W. Stoke, president of the University of New Hampshire; Wallace P. Cohoe, of New York, and Eric Rideal, of London, past and incumbent presidents of the Society of Chemical Industry; and Edward R. Weidlein, director of the Mellon Institute.

Also honored at the opening meeting were Ira A. Gould, Jr., professor of dairy manufacturing at the University of Maryland, and David E. Green, research associate in the Columbia University College of Physicians and Surgeons. They received, respectively, the Borden Company Award for research in the chemistry of milk and the first Paul-Lewis Laboratories Award in Enzyme Chemistry.

Announced at the Alpha Chi Sigma dinner Tuesday evening was that the next recipient of the American Chemical Society Award in Pure Chemistry, sponsored by the fraternity, is Professor Charles C. Price, of the University of Notre Dame.

RUBBER AND OTHER POLYMERS

Charles F. Fryling, of Phillips Petroleum Co., described a new synthetic rubber with more bounce and stretch than any

Glenn T. Seaborg, of the University of Chicago, presides at nuclear symposium.

Leopold Ruzicka, noted Swiss chemist, speaks on "Constitution of Triterpenes."

Erwin Brand, left, secretary of the Division of Biological Chemistry, and David E. Green, winner of the first Paul-Lewis Laboratories Award in Enzyme Chemistry.

produced currently. It is a copolymer of styrene and isoprene, the basic unit of natural rubber. Until recently, isoprene, which can be produced from turpentine, petroleum, or natural gas, could not be obtained pure enough to polymerize readily. Chemists of the U. S. Rubber Co. claimed a better processing GR-S by the incorporation of a modifying polymer which yields a gel structure during polymerization and reduces shrinkage.

Chemists of the Du Pont Co. described two new plastics. One is "elastic nylon," N-substituted polyamides with elastic properties approaching those of rubber. This is a laboratory development only, and will not be available commercially for a long time, if ever. The other is Teflon, a polytetrafluoroethylene, remarkable for its resistance to heat and chemicals (*this issue*, p. 781).

ANTIMALARIALS

During the years 1941-1945 approximately 14,000 chemical compounds, of which about one-third were synthesized for the first time, were tested for antimalarial action, according to Robert C. Elderfield, Columbia University. Results of these tests, carried out in laboratories under contract with the OSRD and cooperating pharmaceutical laboratories, were assembled, tabulated, evaluated and correlated in the Office of Survey of Antimalarial Drugs.

Antimalarials are of two classes: suppressive and curative. Atabrine is an example of the first class, and relapses may ensue and continue when administration of the drug is stopped. Several of the suppressive type have been introduced, all of which appear to be superior to atabrine. Of these, a promising group is the 4-aminoquinoline derivatives of which SN (Survey Number) 7618, or 4-(4′-diethylamino-1′-methylbutylamino)-7-chloroquinoline, appears to be most effective. Other groups of interest are the quinoline carbinols and variants of the sulfa drugs.

Among the curatives, only one chemical class, the 8-aminoquinolines, has given promise. The Germans did intensive work on these and developed Plasmochin, or Pamaquine. American workers have developed one, SN 13276, or 6-methoxy-8-(5′-isoproplyaminopentylamino)-quinoline.

AGRICULTURAL

A development of potentially great significance in industrial alcohol manufacture was reported by L. A. Underkofler, G. M. Severson, and K. J. Goering, of Iowa State College. Plant-scale use of "mold bran," produced by growing the mold *Aspergillus oryzae*, in the fermentation of grain has resulted in greater yields of alcohol coupled with a reduced use of more expensive and difficultly obtainable malt.

At present prices for grain of 2¢ per pound and for malt of 4.8¢ per pound, mold bran has a value of 12.5¢ per pound when used in combination with malt, assuming no increases in alcohol yield. Currently mold bran is somewhat more expensive to produce than malt, but since mold bran has a minimum value two or three times greater than that of malt, its use at current prices has effected considerable savings in the Defense Plant Corporation plant at Omaha, Nebraska, where it has been in use.

Another advance in saccharification techniques was described by F. F. Nord, of Fordham University. Members of the mold family, Fusaria, are utilized to break down the pentoses, heretofore non-fermentable. The new mold ferments both the hexoses and the pentoses, increasing by about 20 per cent the yield of alcohol obtainable by wood saccharification.

The rate of depletion of the Tennessee phosphate deposits has prompted TVA to undertake research in anticipation of increased utilization of the deposits in Florida. Since transportation of fertilizer material from Florida presents an expense problem, research was directed towards more concentrated fertilizer materials. Reduction of mineral phosphates yields white phosphorus, which is unsuitable for formulation into fertilizers, and previous methods of conversion to red phosphorus, the stable form, were too costly. TVA has now developed a continuous process which involves heating the white phosphorus at its boiling point until the desired percentage of conversion is attained, overflow of the slurry into a screw conveyor where the white phosphorus is vaporized by hot carbon monoxide, discharge of the red phosphorus from the conveyor, and return of the condensed white phosphorus vapor to the system.

PETROLEUM CHEMISTRY

Sinclair Refining Co. described a direct amination process whereby olefins are converted into aliphatic amines and nitriles. Utilizing a catalytic reaction of ammonia with components of refinery gases—both lowest cost sources of nitrogen, and carbon and hydrogen, respectively—ethylene and propylene yield acetonitrile, propionitrile and butyronitrile. Other compounds which can be manufactured economically by the new process are butyronitrile, acrylonitrile, and ethyl, isopropyl, and n-butyl amines.

Research men of Union Oil Co. of California reported that hydrocarbon hydroperoxides, of the general formula ROOH where R is a hydrocarbon radical of 6 to 8 carbon atoms, are now being produced from petroleum in virtually pure form. They are expected to find use as polymerization catalysts, Diesel fuel improvers, germicides, and as intermediates for synthesis.

Improved processes for manufacturing ethylbenzene, precursor of styrene, were described by workers in the laboratories of Socony-Vacuum Oil Co. One is a liquid-phase reaction in the presence of aluminum chloride. It differs from previous processes in that a higher temperature is used (212° F. instead of 150°-190° F.) and pressure is applied to the ethylene. The reaction is faster and it is said that dilute ethylene—down to 10 per cent—can be employed. The other process operates in the vapor phase with regular cracking catalysts at 950° F. and 50 lbs. pressure. With a five-fold excess of benzene, 80 per cent conversion to ethylbenzene in one step is reported.

OTHER PAPERS

An able summary of German chemical developments was given by R. Lindley Murray, of Hooker Electrochemical Co., before the Division of Industrial and Engineering Chemistry luncheon Wednesday noon (*this issue*, p. 788).

A useful and interesting application of a low-temperature cryostat was demonstrated. It is used in connection with a bolometer, which directs infra-red radiation. At a critical range of temperature, obtained by using liquid nitrogen and hydrogen, the bolometer is capable of detecting a man or any object emitting heat at considerable distances.

Electronics Improves
INDUSTRIAL PROCESS CONTROL
Part 1. Electronic Potentiometers and X-Ray Spectrometry

by DOUGLAS M. CONSIDINE* and DONALD P. ECKMAN**

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OPERATION OF TODAY'S COMPLEX CHEMICAL PROCESSING OPERATIONS would be extremely difficult, if not impossible, without precise reliable instrumentation. Here, continuing Chemical Industries description of physical aids to chemical plant control, the operation and applications of the electronic potentiometer and the Geiger-Counter X-ray spectrometer are described.

INSTRUMENTATION has outgrown its swaddling clothes and no longer can be summarized in terms of mercury thermometers, pressure gauges, and flow meters. The utilization of electronic principles in industrial measurements has launched instrumentation into a new era.

POTENTIOMETERS

The increasing application of the self-balancing recording potentiometer to chemical processing has been brought about largely by the advent of basic improvements in the detecting and rebalancing mechanisms employed. One improvement is a direct result of using electrical means, other than the conventional galvanometer, for detecting changes in the measured variable. Further improvement has resulted by replacing the cyclic rebalancing mechanism with an electronically controlled motor which continuously rebalances the indicating or recording system to correspond to changes in the measured variable.

The detecting and rebalancing means used in one type of electronic potentiometer are illustrated schematically in Fig. 1. Briefly, the direct current millivoltage of the thermocouple is changed to an AC voltage of proportional magnitude in a converter, which is essentially a flat metal reed oscillating between two contacts connected to the opposite ends of the primary winding on an input transformer. The unbalanced DC voltage is impressed across the converter and the center tap of the primary winding on the input transformer. As the reed moves from one contact to the other, any unbalanced DC voltage will cause direct current to flow first in one direction through one-half the primary winding, then in the opposite direction through the other half. This action generates an alternating flux in the input transformer core which, in turn, induces an alternating voltage on the transformer secondary.

The action of the converter is related to the AC supply voltage by the energizing coil which is excited by the AC supply voltage through a stepdown transformer. The reed is polarized by a permanent magnet and, therefore, is actuated by the energizing coil to oscillate in synchronism with the AC supply voltage. The reed closes one contact to the transformer for one-half the supply voltage cycle and the other contact for the other half, making one complete oscillation for each cycle. The direct current flowing in each half of the transformer primary winding, therefore, will create an alternating voltage in the transformer secondary of the same frequency as the supply voltage. This alternating voltage is amplified in voltage and power to actuate a two-phase balancing motor.

If there is an unbalance between the slide wire voltage and the thermocouple voltage, the balancing motor functions to rebalance the two voltages by moving the slider on the slide wire. The direction in which the motor turns is determined by a definite phase relationship between the AC supply voltage and the amplified AC thermocouple voltage. This relationship depends, of course, upon whether the measured variable is increasing or decreasing in magnitude.

This principle in potentiometric meas-

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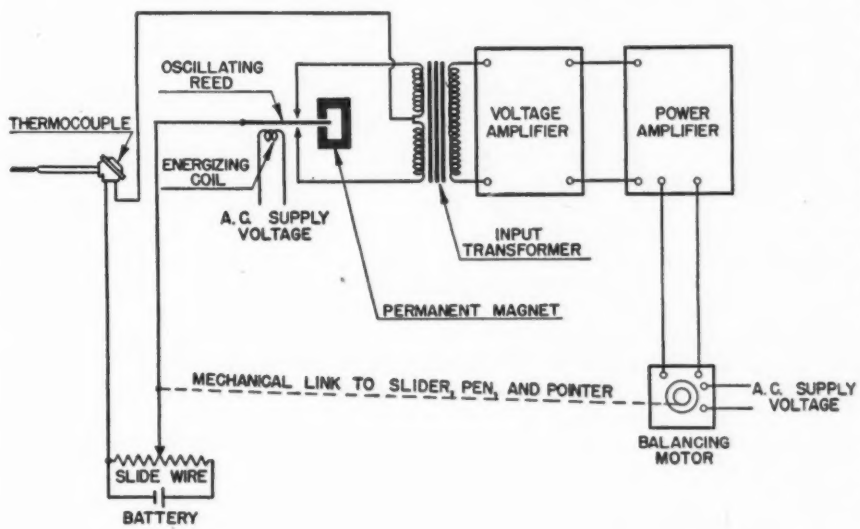
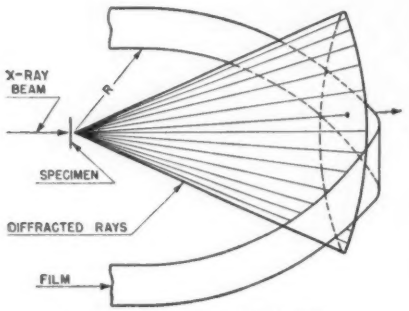


SCHEMATIC DIAGRAM OF ELECTRONIC POTENTIOMETER

COURTESY: BROWN INSTRUMENT CO.

FIG. 1

acy of measurement, and better reproducibility. In addition to temperature, such process variables as pH, high vacuum, spectrographic quantities, rotative speeds, and mechanical strain are particularly adaptable to measurement with this



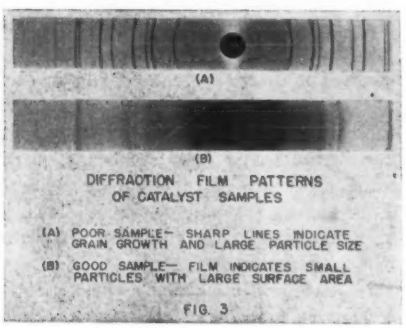
FILM TYPE X-RAY SPECTROMETER
FIG. 2

type of continuously balancing potentiometer.

Higher indicating and recording speeds, down to approximatly four seconds across scale for many of these instruments, have brought about the first really adequate means for measuring multiple temperatures. Instruments indicating, with speed and precision, as many as 48 separate temperatures permit scanning of a chemical unit operation as has never been done before. To plot data on a unit of operation where it is often necessary to know the temperatures at many intermediate points is but a matter of a few minutes.

Greater sensitivity of measurement has been accomplished through improvements in the rebalancing mechanism. In most cases, positive detection of changes as small as three-hundredths of one per cent of full scale is realized. On a pyrometer calibrated from 0 to 300° F., for example, this sensitivity will allow consistent measurement of changes in temperature as low as nine-hundredths of one degree.

The advantages of higher speeds of operation and greater sensitivity of


(A)
(B)
DIFFRACTION FILM PATTERNS OF CATALYST SAMPLES
(A) POOR SAMPLE— SHARP LINES INDICATE GRAIN GROWTH AND LARGE PARTICLE SIZE
(B) GOOD SAMPLE— FILM INDICATES SMALL PARTICLES WITH LARGE SURFACE AREA
FIG. 3

measurement are multiplied in automatic control. It has been shown that in automatic control any increase in the speed of measurement will result in a considerable increase in the speed at which the measured variable will be returned to the desired value. This fact is true, since the period of cycling of a process under control is about four times the total lag of the system. If this lag is reduced by faster means of measurement, then the process will stabilize much more quickly.

The advantage of low measuring lag is easily noted in the automatic control of processes where the total lag is small, such as in the control of blower air temperatures. In some cases it has been found that, if the measuring lag is reduced to a minimum by employing the newer electronic types of potentiometers, proportional or throttling control may be replaced by the simple type on-off or two-position control.

On those processes which have a relatively large total lag or large heat capacity, such as heat exchangers, an instrument with a high sensitivity of measurement is of great advantage to automatic control. For example, in controlling temperatures associated with heat exchangers, changes in load and other unpredictable variations in processing cause the controlled temperature to deviate slowly from the desired value. The newer types of potentiometer controllers, which enable speedier response to small changes, apply a corrective action much sooner and reduce the deviation of temperature from the desired value.

The use of electronic and electro-mechanical components has virtually eliminated the multiplicity of moving mechanical parts common to previous potentiometers. Longer life is attained because of reduced wear on fewer moving parts. Reproducability is also improved as a result of reduction in wear.

GEIGER—MULLER TUBE
COURTESY: NORTH AMERICAN PHILIPS CO., INC.
FIG. 4

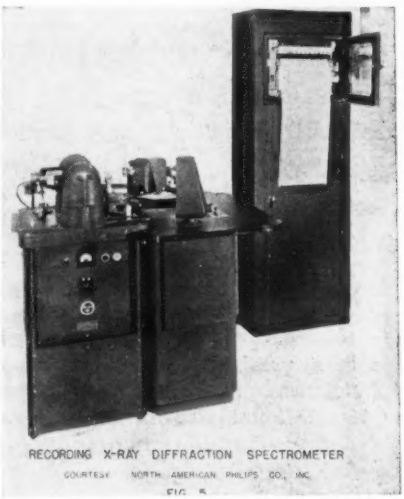
The sturdiness and reliability of the electronic potentiometer has been proved in severe service. The absence of a delicate galvanometer movement and its associated mechanism make an instrument which, in any respects, is more powerful and rugged than the simplest pressure type thermometer.

The items which follow point to a few of many applications which either are rendered possible through use of the newer types of potentiometers, or which are increased considerably in their overall usefulness.

X-RAY SPECTROMETER

X-ray diffraction has been used by the chemical process industries as an analytical tool to determine the ultimate structure of materials for several years, for example, in (1) the rubber industry—to control the addition of dyes, fillers, and accelerators to the rubber batch; and in (2) the battery manufacturing industry—to select manganese dioxide ores required to impart specific battery characteristics and performance.

Until recently the time and technique required to perform and evaluate an analysis have limited the usefulness of this tool. The development of an X-ray spectrometer which greatly reduces the time required for analysis and which practically eliminates the need for special techniques in performing analyses is principally the result of two achievements in electronics, namely: (1) the Geiger-Muller tube, and (2) the continuously


RECORDING X-RAY DIFFRACTION SPECTROMETER
COURTESY: NORTH AMERICAN PHILIPS CO., INC.
FIG. 5

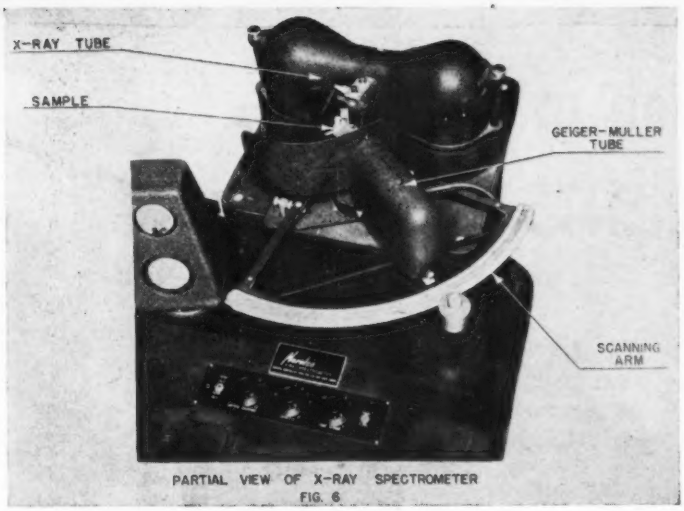
balanced high speed recording potentiometer.

VIA PHOTOGRAPHY

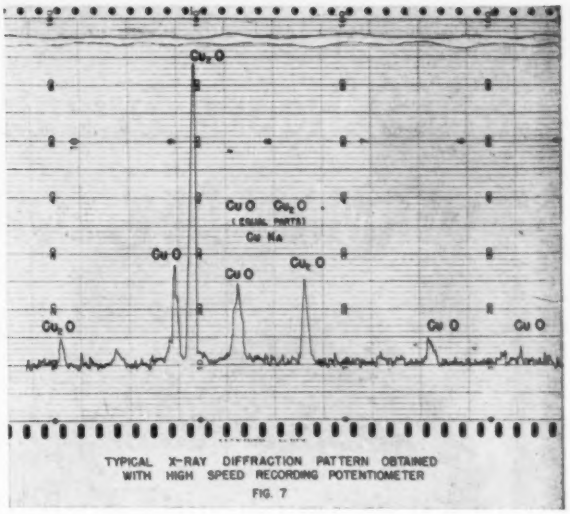
When a finely collimated, essentially monochromatic beam of X-radiation bathes a properly prepared sample of material under test, a series of secondary reflected beams emerges. As illustrated in Fig. 2, the secondary beams emerge from the sample in the form of a diffraction cone.

By intercepting these beams with a strip of properly sensitized photographic film, a series of diffraction lines in the form of arcs of concentric circles is obtained (illustrated in Fig. 3). The spacings of the lines is indicative of the materials present and line density indicates the relative amounts of each material present in the sample. These lines occur wherever there is reinforcement of reflections from the surface and underlying atomic planes in the material. The phenomenon applies to all crystalline and to many amorphous substances. No two different materials have been found to exhibit the same diffraction pattern.

With the photographic method, considerable time is required (1) to set up the unit and prepare the film before exposure, (2) to expose the film and (3) to develop the film after exposure. This varies from



PARTIAL VIEW OF X-RAY SPECTROMETER
FIG. 6



TYPICAL X-RAY DIFFRACTION PATTERN OBTAINED WITH HIGH SPEED RECORDING POTENTIOMETER
FIG. 7

10 minutes minimum, to 10 hours maximum. Once the film is developed, there remains a time-consuming, manual task of measuring the line spacings and evaluating the line densities.

The photographic film has been replaced by the Geiger-Muller tube, illustrated in Fig. 4. This tube actually counts the quanta of X-ray energy reflected from the sample. The tube is prepared with close to 100 per cent efficiency for the characteristic X-ray wavelength used in the spectrometer. In other words, one count is produced for almost every X-ray quantum entering the tube. It is interesting to compare this sensitivity with that of film which requires from 10^4 to 10^5 quanta to produce a diffraction line of minimum detectable darkness.

WITH GEIGER-MULLER TUBE

The Geiger-Muller tube is essentially a sealed tube containing an ionizable gas. Energy impinging on the tube causes partial ionization of the gas. The formation of a single ion pair anywhere within the active volume of the counter tube releases a flow of current sufficiently large to operate a relay directly. This current is amplified electronically over a range of 0 to 50 millivolts, which is fed to the high speed recording potentiometer, illustrated in Fig. 5. The recorder scale is evenly divided and is graduated from 0 to 100.

In the photographic method, the strip of film is stationary. Where the counter tube is used, however, the tube is rotated about the sample so that it will scan the field of diffraction lines, that is, so that it will be progressively exposed to the various diffracted beams reflected from the sample.

Illustrated in Fig. 6, the counter tube is rotated through 90 degrees of arc by means of a motor-driven scanning arm. This speed of rotation is precisely coordinated with the chart speed of the potentiometer to create an exact space relationship of the various intensity peaks and dips from the sample. Ninety minutes are required to obtain a complete diffraction pattern with the high speed recorder. Where an automatic recorder is not used it is necessary to manually position the scanning arm each 0.05 degrees, requiring a total of 1,800 positions.

The type of pattern obtained with the electronic recorder is illustrated in Fig. 7. This curve shows the proportions of cuprous and cupric oxides in a marine antifouling paint. The ratio of cuprous and cupric oxides must be held within close limits for optimum results, a difficult problem in the past. By use of the X-ray spectrometer differentation of the two products and determination of their relative proportions are easily effected.

The continuous high speed operation of the recorder renders it possible to detect almost instantaneously the changes in the secondary radiation from the sample as the counter tube rotates. The fast pen speed of 4½ seconds across scale and the high chart speed of 120 inches per hour make it possible to spread out the record, contributing to convenience and accuracy in analyzing the diffraction pattern.

Saccharin from Anthranilic Acid

ANTHRANILIC ACID (o-aminobenzoic acid) has been found to be a satisfactory starting material for the synthesis of saccharin, according to a translated report, PB 901, of the Office of the Publication Board, Department of Commerce.

The principal steps in the synthesis have been described in patents, DRP 130119 and 122567, issued to Ciba. The process involves the dizaotization of anthranilic acid to produce o-carboxy methyl benzene sulfinic acid, followed by the introduction of chlorine gas into an alkaline solution of the sulfinic acid to form the o-carboxy methyl benzene sulfochloride. This product is converted to saccharin by the addition of ammonia.

Researchers at I. G. Farbenindustrie found that a high yield of o-carboxy methyl benzene sulfinic acid was obtained when the diazotization was carried out in aqueous sulfuric acid solution, with sulfur dioxide added in liquid form to the cooled diazotate. Pure copper powder was used to start the reaction instead of copper salts.

Removal of the copper sludge by filtration from the slightly alkaline solution allows production of the sulfinic acid in an easily filterable form upon acidification with mineral acid. It was also observed that addition of chlorine gas to a slightly alkaline solution of the sulfinic acid converted it into the sulfochloride which precipitated quantitatively for removal via filtration. Addition of the o-carboxy methyl benzene sulfochloride to ammonia converted it to saccharin (benzosulfimide), which was isolated by acidification with hydrochloric acid. The yield was about 90% based on the sulfochloride.

The only intermediate material isolated was o-carboxy methyl benzene sulfochloride. Based on anthranilic acid, the yield of saccharin was 58-60%. In Germany, it was stated that the cost price was as low as that of the old Fahlberg process.

In the Fahlberg process toluene is sulfonated with chlorosulfonic acid to a mixture of the ortho and para isomers of toluene sulfonyl chloride. The undesired para isomer is removed by pouring the products into water and freezing. The residual o-toluene sulfonyl chloride is converted to the corresponding sulfonamide with aqueous ammonia, dissolved in sodium hydroxide and oxidized with potassium permanganate to form the sodium salt of o-sulfamyl benzoic acid. Removal of the manganese dioxide by filtration and formation of the saccharin (benzosulfimide) by acidification with hydrochloric acid completes the process.

ACS Hears Evaluation of GERMAN DEVELOPMENTS

R. Lindley Murray and German friend.

ALTHOUGH OUR OWN TECHNOLOGY IS GENERALLY SUPERIOR, American chemical industry can learn much from the processes and techniques used by Germany during the war. Our observer at the Industrial and Engineering Chemistry luncheon at the recent ACS meeting reports here on the talk given before that luncheon by R. Lindley Murray, of Hooker Electrochemical Company. Mr. Murray presented one of the most discerning summaries of German developments we have heard.

ALL of us who went to Germany to study their developments and progress in the chemical field have repeatedly been asked, "What did you think of their chemical technology? Were they ahead of us or weren't they?" My answer is that in some few respects I think they were ahead of us but on the broad overall picture, "No."

This comment by R. Lindley Murray, vice-president of Hooker Electrochemical Co., Niagara Falls, N. Y., substantiates the general impression gained by most of the American observers in Germany: There is much in the German chemistry and technology that is admirable, considering the raw materials and equipment available to them, but little of it is applicable on a commercial scale in this country, simply because we do not have to resort to circumvention of raw material shortages.

Much has appeared out of Germany in the way of technical reports and evaluations, but Mr. Murray's talk before the luncheon of the Division of Industrial and Engineering Chemistry at the recent American Chemical Society meeting gives a perspective which is perhaps more difficult to obtain from examination of the more detailed and specialized reports.

HIGHLIGHTS

Stymied by a lack of ethylene, the Germans had to develop a chemistry based on acetylene, which they could make from carbide or from waste gases. Not only were ingenious schemes worked out for the preparation of butadiene, ethylene and its derivatives, acrylic and adipic acids, but new catalysts were developed and new techniques for handling the fearful acetylene.

Another noteworthy achievement was the mercury cell for electrolytic chlorine manufacture. The caustic produced in this cell was of rayon grade. Also, the oxidation of hydrochloric acid to chlorine was developed to the point where it might find usefulness here.

In plastics, the use of polyvinyl ethers had no counterpart in this country, and the shipment of unstabilized vinyl chloride monomer in an atmosphere of nitrogen was resourceful.

While production of synthetic detergents and related materials was very high, most of the commercial materials are known here. In dyestuffs, however, where Germany has often been foremost, new and remarkable materials were developed. Steam was generated at pressures up to 2000 p.s.i. and piped at as many as four pressures throughout the plant. Also, a new fabrication technique made autoclaves of superior construction and at less expenditure of time and costly materials.

Some excerpts from Mr. Murray's talk follow:

"ERSATZE"

Unavailability of certain raw materials, particularly petroleum hydrocarbons and fats and oils, led to tremendous and amazing technological developments.

Acetylene Chemistry.—The hydrogenation of acetylene to ethylene was carried out on a very large scale, the ethylene thus formed being widely used as the raw material for many of the same derivatives for which it is used here. In addition, a very substantial amount of butadiene was made from acetylene by either of two processes, one via acetaldehyde and aldol and the other, which was more economical of acetylene, by reaction with formaldehyde to 1,4-butynediol to 1,4-butanediol and thence by dehydration to tetrahydrofuran and finally to butadiene. (*See* CHEMICAL INDUSTRIES, September, 1945, p. 456.) Neither of these processes can compete with the process by which we make butadiene from petroleum.

German acetylene chemistry (frequently called *Reppe Chemie* after the German genius, Dr. Walter Reppe) has received wide publicity during the past year and rightly so. German controlled carbide and acetylene production was considerably greater than ours and no wonder, when the amount that was required for chemical purposes is taken into account.

Of great importance was the development of a safe method for compressing acetylene to 20 and 30 atmospheres and for handling it at these pressures. This single development opened up a tremendous field and made the vinylation reaction comparable to sulphonation or nitration. The use of alkali alcoholate catalysts made possible the production of vinyl ethers and vinyl amines. Zinc salts of organic acids were developed as catalysts for making ring-substituted phenols, and the truly remarkable development of the copper acetylide catalyst makes possible addition at one or both of the carbon atoms, leaving the triple bond intact. Another catalyst was nickel carbonyl, which was used to introduce CO into the molecules. This led to the synthesis of acrylic and adipic acids.

Any statement about German acetylene developments would be quite incomplete without reference to the arc process for producing acetylene at Huls. This process used, as raw material, waste gas from the hydrogenation of coal, natural gas, and coke-oven gas residues. A capacity of something like 70,000 tons of acetylene a year was attained with a power consumption of around 4.6 KWH per lb. of C_2H_2. This development, at least in so far as scale of operations is concerned, can find no counterpart in the U. S. as yet.

Liquid Fuels.—Another outstanding example of the Germans' resourcefulness was the very large-scale development of two processes for the production of liquid fuels and other petroleum type hydrocarbons, starting from coal and other

non-petroleum raw materials. Two processes were employed on a big scale: the Bergius process, which involved hydrogenation; and the Fisher-Tropsch process, which involved passing carefully purified carbon monoxide and hydrogen (water gas) over an iron or cobalt oxide catalyst plus small amounts of thoria deposited on Kieselguhr. This produced mixed hydrocarbons, the lower boilers making good Diesel oil and, blended with benzol, gasoline. The higher fractions were partially olefinic and were used in part to make lube oils and synthetic detergents.

Over 600,000 tons of liquid fuels a year were produced at Leuna alone. This liquid fuel program used such tremendous quantities of hydrogen that synthetic ammonia production, particularly at Leuna, was seriously curtailed. Our vast petroleum supplies made such developments as these completely unnecessary, and they have no counterpart in the U. S.

Synthetic Glycerine.—Very ingenious processes were worked out and plants built for the production of glycerine by the hydrogenation of sugar and from propylene, obtained by the dehydration of propyl alcohol, via allyl chloride. This latter process, incidentally, was not particularly successful, and output fell far below expected capacity due to chemical engineering difficulties. Although there has been some activity in connection with the production of glycerine from propylene in this country, the tremendous amount of glycerine produced from fats and oils makes neither of these two processes necessary, and there is serious doubt whether they could compete except in rather special circumstances.

The serious shortages of fats and oils completely stopped ordinary soap production. This gave rise to tremendous developments in the field of synthetic detergents, emulsifiers and wetting agents.

NITROGEN FIXATION

We are all familiar with the German chemical industry's tremendous developments in the field of nitrogen fixation.

I am not a nitrogen expert, but Cy Folger of Allied Chemical, who is, made a particular survey of the German nitrogen industry just as the war was ending, and he tells me that the technology of the German nitrogen plants was not ahead of our practice in this country. Their improvements in gas production from coke and the continuous Winkler gas generator operating on brown coal coke using oxygen-enriched air from Linde-Frankl units were noteworthy. Germany produced about 1,000,000 tons of synthetic ammonia at the start of the war, and although some additional capacity was installed, production was curtailed in favor of the liquid fuel production I have already mentioned. I believe our synthetic ammonia production and certainly our installed capacity were greater than peak German production.

*Chlorine.**—The growth of the German chlorine industry and their development of the mercury cell were naturally of particular interest to me. Two of the latest-type horizontal cells and one of their newest rotating vertical cells are now crated and are only awaiting reparations commission approval before being shipped to this country where they will probably be set up and operated, the results being available to the entire U. S. chlorine industry.

MERCURY CELL

There can be no question that the mercury cell was brought to a high state of development by the Germans. The high amperage horizontal cell was more fully perfected than the rotating vertical cell which, while very interesting, must still be considered in the developmental stage. Chief advantages of the latter are its economy of floor space and the smaller amount of mercury initially required.

I am frequently asked how the best mercury cells compare with the better U. S. diaphragm cells and why the Germans have favored the mercury cells in their expansions during the past decade. The answer to this question is a complex one and involves a balancing of power, fuel, labor and investment costs. There is no question but that the total investment, including caustic evaporation, and operating costs are less with the better diaphragm cells than with the German mercury cells, providing rayon quality caustic is not required. If further purification of diaphragm cell caustic is included, the economic balance will depend upon the particular cost of power, fuel, mercury and labor rates. The mercury cell is a good deal trickier to operate well and requires much more extensive and costly brine purification. On the other hand, it does not require extensive caustic evaporation equipment and expense, and it makes a caustic soda of superlative purity which cannot be approached with diaphragm cells without further purification. Another factor in the widespread use of the mercury cell in Germany is the fact that about its only competition was with the Billiter diaphragm cell, which cannot be compared with the better U. S. diaphragm cells.

HYDROGEN CHLORIDE OXIDATION

At Oppau was a very interesting commercial plant for the conversion of HCl to chlorine. The process consisted of bubbling a pre-heated mixture of five parts by weight of HCl to one of oxygen plus recycle gas through a molten bath consisting of seven parts of anhydrous ferric chloride and three parts of KCl. This was done in an acid-proof brick lined steel oven maintained at 450°C. As the reaction is exothermic, it was necessary to apply heat by means of electrodes only at the start. The conversion per pass was claimed to be about 75 per cent. The gases leaving the contact oven were cooled by scrubbing with 36 per cent muriatic acid, dried with sulfuric acid and then passed through sulfur monochloride, which absorbed the chlorine. The resulting mixture of sulfur mono- and dichlorides was then fractionally distilled at 7 atmospheres pressure through a column, the top section of which contained activated carbon. The

* Data on German chlorine production and distribution will be found in this issue, page 870.

Roy Sudhoff, of Monsanto Chemical Co.; a driver; Jean Kern, of National Aniline Division, Allied Chem. & Dye Corp.; and Murray in front of vehicle in which the team traveled.

stripped sulfur monochloride was recycled and the chlorine leaving the carbon scrubber at the top of the column was readily liquefied by river water cooling. A liquid chlorine reflux was used in the column. The gases leaving the sulfur chloride scrubber were freed of traces of sulfur chloride by treatment with a small amount of chlorine and water, and by refrigerating to –20°C, and then recycled back to the contact oven.

The process was said to operate very well and, if operated on a large scale, capable of making chlorine for about half the usual cost providing no charge was made for the HCl. It is possible that this process may find application in the U. S.

Recent reports indicate that the Germans had also made considerable progress in the development of an electrolytic HCl cell for the production of chlorine from HCl.

POLYMERS

Recent German developments in the field of polymers, resins and plastics were most ably covered by Dr. Klein, Roy Sudhoff, Ray Boundy and Leonard Hasche. I am indebted to Leonard Hasche for a good many of my observations.

The Germans were very short of cellulose, and as a result their development of cellulose ester and cellulose ether plastics was very restricted.

On the other hand, they had made great progress in polyvinyl chloride, acetate and ethers, and their production capacity for these materials was very substantial. They were certainly ahead of us in their use of unplasticized PVC for moulding compositions, for spinning into filaments, and as a substitute for stainless steels in chemical equipment. The welding of this material with a hot air torch was of real interest. Their shipment of unstabilized pure vinyl chloride in steel tank cars under a blanket of nitrogen was noteworthy. Their development of polyvinyl acetate, polyvinyl alcohol and its acetals was probably not as far advanced as ours.

Their development of polyvinyl ethers for adhesives, lacquers and coatings had no counterpart in this country. Their polymethyl methacrylate in the form of Plexiglas was probably the equal of ours for war purposes, and the novel machine for assembling the polymerization cells which they had at Darmstadt was unique and probably constituted an advance in the art.

Hasche believes that the Germans were quite well advanced in the preparation of certain monomers and in new types of polymerization. Their continuous mass polymerization of styrene and their method of polymerizing isobutylene in liquid ethylene were examples of such advances. Other examples were the spray drying of PVC produced by emulsion polymerization. The synthesis of adipic acid and caprolactam starting with formaldehyde and acetylene, the synthesis of HCN from methanol and ammonia and of acrylonitrile from acetylene and HCN in the vapor phase were noteworthy examples of *Reppe Chemie*.

German production of acrylics, styrene polymers, polyisobutylene, the polyamides, and, of course, the Buna rubbers was substantial. However, they had no developments which remotely approached in size our huge and quickly built synthetic rubber program.

Bomb destruction of a chemical plant in Darmstadt. Later bombing strategy, it is understood, was to leave plants intact for production but to cripple them by destroying railroads.

FINE CHEMICALS

As is natural, considering that they have been at it longer than any other nation, the German dye industry was developed to the peak of scientific achievement. I am not a dye expert but my team-mate, Jean Kern, is—and a most outstanding one. Discussions with him during our three months abroad led me to the conclusion that some of their dyestuffs, particularly their vat dyes, Thermofor colors and Lumogene (luminescent) paints, were most remarkable and in some respects ahead of ours. They had developed some new green, blue, and brown vat dyes and also certain anthraquinone and azo vat dyes of a new type which were soluble. The Lumogenes were invisible in the dark except when activated by ultra-violet light, and they had exactly the same shades under ultra-violet as they had in daylight. Their alcohol-soluble metallized dyes were outstanding and particularly suitable for coloring wood and plastics and dyeing nylon.

Their dye plant chemical engineering as exemplified at Höchst and at Ludwigshafen was most outstanding and included beautiful and spacious manufacturing layouts, highly developed controls, and very large units of equipment. According to Kern, their dye kettles were much larger than those generally used in the U. S.

The Germans have done a great deal of work on organic insecticides. Much of this work seems to have been directed toward the objective of getting around the well-known Geigy DDT patent. In general their application testing was not so thoroughly done as is now the practice here, and many of their effectiveness claims were probably considerably exaggerated and have not been borne out by carefully organized tests in this country.

Lauseto-Old contained DDT and a number of analogs of DDT. It was made with one mol of chlorobenzol and one mol of benzol instead of using monochlorobenzene alone.

Lauseto-New was, roughly speaking, a mixture of phenyl chloromethyl sulphone and *p*-chlorophenyl chloromethyl sulphone. It was claimed to be much better than DDT on lice. Tests made in this country seem to indicate that it may be somewhat better and that it has the added advantage

of killing the eggs, which DDT is said not to do.

These compounds and many others, including DDD, Gix, the fluoro analog of DDT, and a few organic fungicides and rodenticides, are now undergoing tests in this country, but as these take a long while, the results are not yet conclusive. It is conservative to state that the Germans were not ahead of us in this field.

In the opinion of Ernest Volwiler of Abbott Laboratories, one of the ablest U. S. investigators, German developments in these fields were on about the same plane as our own. Until recently they were probably ahead of us in anti-malarials. This was also true in the field of blood substitutes and alkaloids. On the other hand, they were distinctly behind us in the development of sulfa drugs and of penicillin and other antibiotics. In technology the Germans were definitely not up to us in so far as scale of operations is concerned, but they did have specialized methods which, in some cases, were unique and definite advances. Their production of penicillin was insignificant in comparison to ours.

SYNTHETIC DETERGENTS AND EMULSIFIERS

I am indebted to Jean Kern and Lester Hoyt for many of my observations in this field.

It has been estimated that Germany's peak production of these products (on the active ingredient basis) reached the staggering total of about 150,000 tons a year, which is, I believe, almost twice our highest wartime production. About half of this huge German production was made up of Mersols. This product was made by treating Mepasin (a C_{12}–C_{14} hydrocarbon made by hydrogenating the so-called Kogasin, 240° to 320° fraction of Fischer-Tropsch hydrocarbons) with SO_2 and chlorine. This product was largely shipped to soap makers, who saponified it. The resulting synthetic detergent was of very inferior quality. A later product called Mersolat H, made by a somewhat modified process, was considerably better.

The Igepons represented a series of high grade detergents, especially good for wool, which were of variable constitution; at Höchst there were 57 varieties. Some of the better known Igepons were derived from oleyl chloride, made from synthetic oleic acid by condensation with the sodium salt of hydroxyethanesulphonic acid or the sodium salt of methyltaurine.

The Igepals were another group of high grade detergents made in almost infinite variety, mostly based on ethylene oxide. For some of the more important varieties, ethylene oxide was condensed with fatty alcohols or reacted with alkyl phenols. The properties of these detergents could be modified by the number of oxyethane groups introduced. For example, 6 to 8 oxyethane groups were suitable for wool processing and as emulsifying agents for neutral oils. Compounds containing 10-14 oxyethane groups were more suitable for washing cotton and rayon, while compounds having 20 to 30 oxyethane groups were excellent for emulsifying mineral oils. The introduction of a sulphonic group changed the Igepal from a non-ionic to an anionic detergent.

A great deal of work was done on emulsifiers, the Emulphors being perhaps the most important. One of these was the cyclohexylamine salt of Mepasin phsulfonic acid and another the sodium salt of Mepasin sulfamidoacetic acid. These were such excellent cutting oils for metal processing and as drawing compounds that their use was almost entirely restricted to these important war needs. They were quite outstanding for this purpose because they were emulsifiers which had great metal affinity and because they contained a rust-preventing polar group. Other types of Emulphors were made from ethylene oxide.

Nekal BX (dibutylnaphthalene sodium sulfonate) was used very extensively as the emulsifying agent in the polymerization of Buna rubbers.

Emulphor STH was also just coming into use as a rust preventive in motor fuels.

The Dismulgan series of emulsion breakers should also be mentioned. One of these was the sodium sulfate ester of oleyl ethylanilide.

It is my observation that the German advances in the detergent, emulsifier and wetting agent field were quite outstanding.

CHEMICAL ENGINEERING

I was very much interested in comparing German chemical engineering, plant design, and equipment with our own. The Germans do not seem to have chemical engineers as we have them. They have chemists and they have engineers, each fulfilling their separate functions but not combined into one. I will briefly touch upon some things that impressed me.

High Pressure Techniques.—My impression was that German developments in the field of high pressure catalytic technology were quite outstanding and in some ways were perhaps a little ahead of ours. This was certainly so if one excludes the progress we have made along this line in the petroleum field, but we should not exclude it. The Germans seemed to follow a philosophy of raising the pressure and temperature and improving the catalyst if a theoretically possible reaction would not "go" under less drastic conditions. In other words, they "forced it to go."

Spirally Wound Pressure Vessels.—The I. G. developed at Oppau and to a considerable extent at the Krupp works in Essen, who operated under a license from them, a most unique and interesting spirally wound pressure vessel called *Wickel-Verfahren*, which they used extensively for autoclaves and for big guns. This type of vessel consisted of a light barrel or core frequently made of corrosion-resistant metals and often lined with rubber and acid-proof brick, upon which was spirally wound the requisite number of layers of specially shaped interlocking bands. These vessels were used for pressures up to 4000 atmospheres (60,000 p.s.i.).

High Pressure Steam Generation.—Steam generation at 1800 to 2000 p.s.i. was not unusual, and in some of the bigger plants steam was piped all around at three and even four different pressures (obviously in separate lines). Incidentally, the high pressure lines glowed with a dull red heat when uninsulated.

Plant Design and Layout.—In their better plants the Germans allowed a great deal of room around their equipment. In fact, the spaciousness of some of their process buildings seemed to border on the extravagant. Acid-proof brick and rubber-lined construction was used a very great deal, and acid-proof floors and tile walls seemed to be the rule rather than the exception, and this was not confined solely to the ground floor.

I did not see a single building in a chemical plant in Germany which had asbestos protected metal or corrugated transite siding. Brick was invariably used.

Except in the larger I.G. plants, I do not think instrumentation was as extensive or carried as far as we do over here. In some of the German plants instruments and automatic controls were quite conspicuous by their absence.

New Type of Rectifier.—A very interesting rectifier was just coming into use in a few of the chlorine plants. As reported by L. C. Turnock, this rectifier was based upon the principle of changing the direction of the AC current impulse at or very near to the exact instant of change in the alternating cycle. This was accomplished by silver-tipped copper contacts that were mechanically opened and closed at the proper moment and in the proper sequence by a revolving cam shaft driven by a synchronous motor receiving its power from the same AC current circuit. It was claimed that this rectifier would give as good conversion efficiency at low voltages as at high voltages, contrary to results with rectifiers so far available in this country. Reports are somewhat conflicting, and it is probably that this rectifier is not fully perfected as yet. An effort is being made to get one of these shipped over here for trial along with the mercury cells.

According to Bob MacMullin, who has just returned from six months in Germany where he served as a very able coordinator of U. S. Technical Investigators, the I. G. Farben, representing about 80 per cent of the German chemical industry, spent from 10 to 12 per cent of their total sales each year for development and research. This is probably four times or more the average rate of the U. S. chemical industry, and it is no wonder that their progress was very great.

FLEXIBLE BUDGETS

Can Assist Chemical Companies in Attaining Profit Objectives

by FLOYD H. ROWLAND
The Floyd H. Rowland Co., New York, N. Y.

A GOOD SYSTEM OF BUDGETARY CONTROL, affecting, as it does, all phases of a company's activities, can go far toward smoothing out control of chemical costs with a resultant favorable effect on profits. Here the flexible budget is introduced as a means of accomplishing this end.

THERE is nothing so hopeless as trying to arouse enthusiasm for attaining a goal which one knows is impossible or not attuned to conditions. The fixed budget requires attainment of a certain goal no matter how the situation has changed since that goal was set. The first to sense the unfairness of such budgets will be the department head, and his judgment of management will be influenced by it. Management itself loses by using a fixed budget because it cannot measure the effectiveness of its department managers and supervisors. The solution is the use of a flexible budget which is attainable, supplemented by an incentive plan. Such a plan makes budget attainment profitable and provides much more positive motivation than mere pride of accomplishment or fear of reproof.

Budgetary control should not be used solely for estimating cash or controlling expenditures, but should be a medium for constructing the company program and used by management both to guide the company's activities and to develop the need for modification and the form such modification should take to insure satisfactory profits. Thus, the term budgetary control, as used herein, embraces top management planning plus the translation of such plans into dollars and cents. The latter step is that which is usually called budgeting. The difficulties experienced with the ordinary budget are due to the fact that it is not an integral part of the operating program. Its inflexibility tends to cause everyone to lose interest in the plan except the executives who made it.

PRELIMINARY STEPS

A prerequisite for sound budgetary control is the establishment of a formal organization plan defining in writing both the authority and the responsibility of each key executive involved in carrying out the projected plan. Unless each individual understands the part he is to play, budgets have little meaning.

Determination of the degree to which each executive has discharged his responsibility is most simply made by use of properly-designed management reports. These reports should be arranged in accordance with the authority and duties defined in the organization manual and should compare the performance of the department with the accepted standards as set up in the budgetary control procedure rather than with the prior year's figures or with the objectives (budgets) set up at the beginning of the period.

Prior years' accomplishments are misleading because they are the result of conditions which are entirely different from those obtaining during the current period. Such comparisons tend to perpetuate the weaknesses of past performance.

Comparison of a department's performance with the original objective is of little value because the current rate of activity probably is different from the rate anticipated. As soon as the firm moves away from anticipated rates of operation, control of expense is lost. This is the fundamental weakness of the "fixed" budget. A comparison with the original plan is necessary on the summary reports, such as the balance sheet and profit and loss budgets, but on other management reports the comparison of results obtained should be made against predetermined standards based upon the activity of the period rather than against the original budget figures.

The Master Budget Performance Report (see p. 793) is divided into two principal sections: a summary of the activities of the current month and a to-date section. The first column of both carry the figures of the original forecasted budget. The second column, the activity budget, carries the standards which should have been met for the rate at which operations actually proceeded. The third column, the performance column, shows actual performance figures to indicate the difference between actual operation and the original plan. The performance variation columns show how well the actual results measured up to predetermined standards and provide a red light when performance varies too far from standards. Thus a means is provided for indicating which operations should be investigated to determine the cause of the variation. This information forms the basis for the adjusted budget for the following period. The last column in the to-date section indicates what will happen to profits if the same conditions continue through the year. If unsatisfactory, proper action can be taken for correction of the difficulty thus noted.

Although it is not necessary to tie the cost system into the budget program, it is advantageous that both budgeting and cost methods be fully integrated. Proper cost methods simplify separation of variations from predetermined budget standards as between controllable expense, variances due to rate of operation, yield, etc.

Capable executives can use almost any method, but their efforts can be greatly facilitated by the use of sound methods and information. Good methods will never obviate the need for good executives.

COMPANY OBJECTIVES

Determination of company objectives involves an analysis of product sales trends, distribution costs, sales advantages and disadvantages, market surveys, etc. With this information management can make the necessary decisions on expanded lines of activity, additional fields of endeavor, and the program to be followed on existing products and processes.

The rapid strides being taken in all phases of chemical production make a knowledge of trends, competing products and processes, etc. of the utmost importance. For example, in the caustic-chlorine industry, originally chlorine was the major product and caustic a by-product. Later they became of nearly equal importance, and at the present time any sales plan must consider three co-products, caustic, chlorine and hydrogen. Such changes in importance necessitated changes in costing. The policy to be followed in costing major products and by-products must be determined with reference to pricing problems, competition, desired sales volume and other overall objectives. These questions are all intertwined and care must be exercised to avoid the possibility that today's decisions do not prove a barrier

to profitable activities in the future.

The budgetary control plan will produce the best results and require the least effort when the management has determined its products and sales objectives for the next three to five years. In chemical companies sales volume for each product can be established only tentatively, but decisions should be made between bulk sales and packaged goods, between industrial sales and consumers' goods, as well as with regard to the amount and direction of contemplated expansion.

Such tentative decisions cannot be expected to stand in the face of radical developments in the field. Competitive developments must be followed and their effect evaluated in order to reduce losses to a minimum. For example, soap companies which have not established themselves in a strong position with regard to synthetics may have difficulty in maintaining their markets.

The long-range objective should be established not only because efficiency is increased when a goal has been set, but also because modifications can be made with more accurate knowledge of results to be expected. Companies which do not establish such objectives are likely to be continually toying with the idea of doing this or that with the result that production departments are handicapped in their action by a fear that the entire program will be discarded or materially changed almost without notice.

The company objective should be established on a sound basis taking into consideration factors outside as well as inside the organization. A sound market research program is called for here to forecast the position of the company in the industry, based on an estimate of conditions prevailing in the industry as a whole.

SALES BUDGET

Companies are now faced with the problem of determining their most profitable peacetime size. Regardless of plant capacity, assets or other essential prerequisites for successful business operation, the size of a business is determined by the sales it can consummate. The sales budget for the ensuing year should be limited to the sales which the company determines it can make during that year. The budget director, in consultation with sales and research executives, should arrive at the sales budget by taking into consideration the desired sales volume, the plant capacity, trends indicated by both market and laboratory research, and other related factors. Because the budget director is responsible for predetemination of profit, it should be his function to designate the allotment of this sales budget between the various product classes or lines of endeavor in instances where this is a controllable factor.

The sales manager should be brought into the discussion and given the task of subdividing the sales budget totals by products and the apportionment of these figures geographically by salesmen and by key customers.

RESEARCH BUDGETS

The necessity for continued research activities demands the establishment of adequate research and development budgets. These budgets may be determined initially in relationship to production and sales, but when competitive conditions or the partial completion of important developments create unusual demands, these budgets will have to be calculated without considering sales ratios. When such a situation exists, it may be a question of getting a return on money already invested, or in some cases, of being beaten to the punch. The research budget is then established as a matter of policy in accordance with the exigencies of the case.

Research costs are one of the hardest elements of expense to estimate, and nowhere in the planning operation is a higher degree of judgment required in making decisions concerning the amounts to be expended. In this department an attempt to make savings at the wrong time or on the wrong project may be the direct cause of far-reaching difficulties. An added difficulty arises from the fact that such decisions are often made, in the final analysis, by an executive who is not qualified to evaluate the various projects except in terms of their end objectives. About the best that can be done is to set the general policy, and appropriate the money to the project as needed. A review of the objectives and accomplishments is desirable when an appropriation is made.

Inasmuch as it is vital to make a continuing effort to know what is happening to all related products and processes—almost to the point of espionage—and many of the people best qualified to evaluate the "whisps" of information which become available are in the Research Department, this type of "research" is in some instances assigned to this department. However, there is a tendency in the industry to set up separate departments to correlate data of this nature.

VARIABLE EXPENSE TABLES

Many budgets when established for the

Items	Source	Forecasted Budget	Activity Budget	Performance	Performance Variation		Budget For Next Month
					Forecast	Activity	
1. Sales 2. Cost of Sales 3. Adjustment for Variations 4. Adjusted Cost of Sales 5. Gross Profit 6. Administrative Expense 7. Administrative Variations 8. Distribution Expense 9. Distribution Variations	Operations Budget						
10. Net Operating Profit							
11. Other Income 12. Other Deductions							
13. Net Profit before Taxes 14. Estimated Taxes 15. Net Profit							
Cash Position 16. Balance at Beginning of period 17. Receipts 18. Disbursements 19. Balance at End of Period	Cash Budget						
Balance Sheet Key Items 20. Accounts Receivable 21. Inventories (at actual) 22. Fixed Assets 23. Accounts Payable 24. Notes Payable 25. Accrued Taxes 26. Net Worth	Balance Sheet Budget						

The Master Budget Performance Report for the current month is shown above. This is used in connection with a chart for the year to date which, except for the last column, is identical with the above. The heading for the last column of the year to date chart would be "Budget for the Remainder of the Period."

ensuing year make certain monetary allowances for each department or each item of expense, the amounts being predicated upon a stipulated rate of operation. Actual circumstances in any specific month may necessitate a different rate of activity. To avoid the necessity of recomputing expense budgets, or the consequent loss of control if not recomputed, variable expense tables are prepared. These tables show a standard amount allowable for each item of expense for each 5 or 10 per cent rate of activity beginning with the lowest possible rate of operation and continuing to the highest rate which may be reached. These tables may be made in chart form if preferred.

Wherever possible, these expense standards are based on analysis rather than on past performance. For instance, the work is analyzed and the number of people required to do it arrived at independently of previous payroll figures. Some items of expense cannot be analyzed in this way, in which case the standard is set between the low and the average of previous performance for each activity rate.

In many operations of chemical processes, direct labor cannot be standardized as a certain number of hours per unit of product. In this case, direct labor should appear on the variable expense tables as a certain allowable amount at each rate of operation. To determine the rate at which a department operated, a basis of measuring activity must be established for each cost center. A cost center, in thiis instance, is the largest organizational unit performing the same general type of operations in which the costs may be expected to vary in relation to a common measuring factor. In the case of production departments, this measuring factor usually will be the units produced. Other departments may be measured on the basis of labor hours, items handled, etc. The basis must be chosen carefully in each instance. The factor chosen should be one which has a bearing on the amount of expense the department should be allowed; it must be simple and easily calculated and should be one which the department head cannot control in order to place himself in a higher activity bracket.

EXPENSE BUDGETS

There are three periods when expense budgets must be considered, (1) In building the original plan for the coming year, (2) In revising the budget for the adjusted rate of operation contemplated for the ensuing month, and (3) In selecting the figures to be used for comparison with actual expenditures for the rate operated. The use of variable expense tables supplies data to be used as budgets in all three instances. Many budget plans compare actual expense with the amount set up in the original plan, thus creating an unfair and impossible comparison. The alternative is complete recomputation of the budget. Variable expense tables eliminate these difficulties.

MATERIAL AND PLANT BUDGETS

The anticipated cost of materials will be based on yield data. With these data in hand, it is a simple matter to determine the amount of materials required for the anticipated sales.

The anticipated expenditures for plant equipment may involve sizable sums of money, particularly in those companies where rapid strides are being made in the development of new processes and new products. This plant budget should be divided into replacement equipment, equipment needed for cost reduction purposes, expansion equipment and new product equipment. This budget should control equipment expenditures so as to remove as far as practicable the surprise element which so often appears "out of the blue" in this classification of expenditures.

SUMMARY BUDGETS

Summarizing all departmental and other budgets into summary budgets is a relatively simple task if the detail budgets have been prepared properly.

The summary budgets include those required to bring together the data appearing in the detail budgets to make the profit and loss and the balance sheet budgets. Summary budgets include the accounts receivable and payable budgets which adjust income and expense for the lag in receipt and payment of cash. From these the cash budget is built. All payroll expense is gathered into a payroll budget. Other items, such as staff expense, etc., may be brought together in this way and an executive given the responsibility for keeping the total expenditures in each within the accepted budget. The plant budget usually contains a section where all changes in depreciation reserves are calculated. From these summary budgets the profit and loss balance and master budgets are computed. The master budget is a recapitulation of the most important data from the other final budgets.

PRELIMINARY BUDGET INSTALLATION

Installation of a complete budgetary control system such as has been described required considerable time—in most companies about a year. During this period, interest may lapse and at the same time the firm does not benefit from any form of control. It is advisable to install a preliminary system lacking some of the refinements required later. This budget is made up of estimates from each department head for the ensuing year. Such estimates are compared with percentage figures which are normally in the hands of the controller. From these two sources and all other information available, the estimates for the ensuing year are made. This procedure has the value of accustoming the organization to the use of budgets and brings to light any special adaptations which may be required of the complete system.

DISTRIBUTION COSTS

Distribution costs should receive special study, especially in those companies having a complex sales program. Many companies develop costs for each product to the point where it enters the finished goods inventory, while sales costs are applied to products by a very loose percentage application, if at all. The cost of selling, billing and collecting should be calculated in detail for each product, developing the different costs for the different sales territories. Standard costs may be applied to sales and administrative expense in the same way standards are applied to manufacturing or processing expense. Such a plan enables accurate reporting of how well each segment or individual in the sales organization is fulfilling his responsibilities. It brings to light those products which are not profitable or which do not produce the desired percentage of profit. It is recognized that in chemical processes certain products are in the nature of by-products and their availability is determined by the amount of another product which is to be produced.

INCENTIVES

The installation of budgetary control makes possible the use of certain highly effective sales and supervisory incentives. Sales incentives are not new. However, a plan which induces sales volume in the amounts desired for each product and at the same time stimulates expense reduction is not in general use.

When standards of performance have been set up for each cost center, the efficiency of those who are in a position to affect the costs arising from the operation of each department may be measured accurately by the comparison of actual costs with the standards established. Any savings made by beating the standards set may be shared with these supervisors. This procedure has many advantages: The supervisors are stimulated to improve efficiency both in the use of men and materials and in the amount of expense incurred. It is unnecessary to include the supervisors in the wage incentives arranged for the direct labor, as they now have a spur which applies to more phases of management than merely the efficient use of labor. The enforcement of the budget is no longer of interest to the finance officers only, but becomes the chief concern of every supervisor in the firm. Such incentives are not an added expense to the company for they are paid from money the firm would never have had without the use of the plan. The efficiency of almost any plant may be increased greatly by the use of such incentives.

This broad incentive, containing special allowances for each factor which it is desired to control, may be based on the standards in the variable expense tables, providing a system which makes all those in a position to influence profit interested in doing so.

Services and Publications of the U. S. TARIFF COMMISSION

by RICHARD M. LAWRENCE*
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THERE is a political adage to the effect that the passage of a tariff act is regularly followed by the overthrow of the party in power. This happened in the case of five of the last seven general tariff acts. "The tariff is loaded with political dynamite" is a familiar saying. It might be added that it has been equally effective in blowing up economic bridges and shattering industrial windows. With the growth in magnitude and complexity of the American economy, however, these fireworks finally became too expensive a luxury. Reversal of our national commercial policy every few years proved a serious detriment to business, and finally, in 1916, the United States Tariff Commission was created to ascertain and report the basic facts of industry and trade as related to the tariff. It has steadily attained stature as one of the great independent agencies of the Federal Government.

A rough idea of the complex and highly ramified problems of the Commission may be gained by considering an outline of the Tariff Act.

THE TARIFF

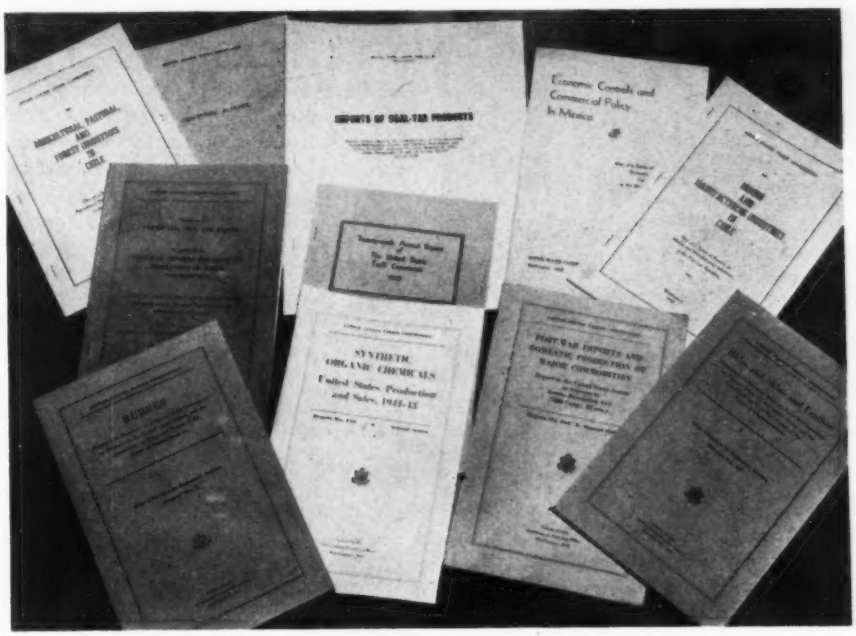
In its simplest aspect, the Tariff Act is a list of merchandise covering everything grown, mined, or manufactured, individually and by classes, for which duties are stated in detail, or which are enumerated as free of duty. Specific duties are those levied per unit of quantity and ad valorem duties those levied on the basis of value. But the basis of value varies; normally it applies to the value in the country of origin, but in some cases, as with coal-tar chemicals, it is the "American Selling Price" of such products if made in the United States, or the "U. S. Value" if not made in the United States. In the latter two cases, the 45% duty is far higher than a 45% duty based on foreign value. Fluctuations in prices and foreign exchange rates continually alter the incidence of all types of duties.

Most United States tariff rates are the same for the goods of all nations but there have been exceptions in favor of Cuba and the Philippine Islands. Some tariff rates (e.g. camphor) have been raised stepwise as domestic output increased. Since 1922 the Tariff Act has provided that tariff rates may be raised or lowered by as much as 50 per cent to equalize differences in foreign and domestic costs of production, as ascertained by the Tariff Commission.

Imports may be entered immediately or placed under bond in government warehouses. In the latter case, the duties may be paid months or years later when the goods are actually entered for consumption. An American firm may receive a drawback (refund) of duties paid upon exporting products made wholly or in part from an imported raw material. For example, preserved foods are exported with drawback of duty on the imported sugar used. To illustrate the possible complexities, in one variation of this practice, copper ore may be imported from British Columbia for smelting at Tacoma and the same company can export an equal quantity of refined American copper from Baltimore, with drawback of duty paid on the British Columbian copper.

Trade agreements, or "tariff treaties," which have been concluded with 27 countries since 1934, provide for reductions of U. S. Tariff rates (up to 50%) in return for similar concessions by foreign countries, thus tending to increase the export trade of both parties. In some cases, quotas limit the volume that can be imported at the reduced rates. "Dumping," or the importation into the United States of goods purchased below the foreign market price (or cost of production) is forbidden, but difficult to prove.

The primary function of the Tariff Commission is to ascertain the relationship of tariffs and other trade controls to the American economy. What tariff rates are needed for the adequate protection of American industry and the greatest market in the world? How can tariff rates and other trade controls here and abroad be modified to promote advan-


Economic Controls and Commerce Policy in Mexico
SYNTHETIC ORGANIC CHEMICALS
United States Production and Sales, 1944

A few of the Tariff Commission publications on chemicals.

* Mr. Lawrence served in the Chemical Division of the Tariff Commission from 1931 to 1937.

tageous international trade? The Tariff Commission was established as a nonpartisan agency to investigate and report upon these matters. It therefore cannot indulge in theories but confines itself to ascertained facts bearing on the question. The huge mass of statistical, technical and economic facts obtained in these investigations makes the Tariff Commission the repository of a great wealth of industrial and trade information.

ORGANIZATION

The Tariff Commission's officials are six commissioners, three Republicans, and three Democrats (and usually at least half of these learned gentlemen are Ph.D.'s!) Among the eminent economists

James H. Hibben, Chief, Chemical Division, United States Tariff Commission.

and foreign trade authorities who have served as Tariff Commissioners are F. W. Taussig, Thomas Walker Page, and Henry F. Grady.

Operations are supervised by the Planning and Reviewing Committee, comprising the Director of Investigation, the Chief of the Economics Divisions, the Chief Economist, the Chief of the Technical Service and the General Counsel. The Commission's 300 employees include 50 commodity and industry specialists, 30 economists, a number of accountants and statisticians, and a specialized library staff. The seven commodity divisions each cover one or more of the Tariff Act Schedules.

The Chemical Division (James H. Hibben, Chief) handles Schedule 1—Chemicals, Oils, and Paints—with the thousands of items included in Paragraphs 1 to 97, plus a number of Free List paragraphs. This sector includes all chemicals of commercial importance and such allied products as petroleum, drugs, paints, plastic materials, synthetic rubber, vegetable oils, perfume and flavoring materials, fertilizers, glue and gelatin, starches, natural resins, and essential oils. This division prepares the monthly and annual reports on synthetic organic chemicals.

The Sundries Division (Paul F. Burnham, Chief) deals with a great variety of articles, including such products of the chemical process industries as leather, rubber, molded plastics, matches, blasting caps and fuses and photographic film.

The Metals Division (F. Morton Leonard, Chief) covers metals and alloys, ores and abrasives and many fabricated products. The fields of the other commodity divisions are indicated by their titles:

Ceramics Division (J. Mark Albertson, Chief).

Textile Division (W. A. Graham Clark, Chief).

Lumber & Paper Division (Franklin H. Smith, Chief).

Agricultural Division (Oscar A. Juve, Chief).

Distribution and Markets Division (Wm. B. Harmon, Acting Chief).

The Economics Division includes experts in international economics, import and export trade, tariffs, price structures, index numbers, statistical procedures, transportation, marketing, etc., and also experts on the industry and trade of the principal commercial nations.

The Tariff Commission supplements the information on imports contained in published statistics of the Department of Commerce through more detailed information obtained by a force which it maintains in New York. This office analyzes import entry papers and obtains extensive data needed by the Commission or by other Government Agencies. The data so obtained are incorporated in the summaries of commodity information, and in other reports issued by the Commission.

The Tariff Commission makes many special studies and supplies a great deal of special information to other departments. In turn, much of the basic data used in the Commission's studies are supplied by other Government agencies, such as the Dept. of Commerce, the Dept. of Agriculture and the Bureau of Mines. Because of these close ties, the Tariff Commission is represented on a number of important interdepartmental committees. These include the Committee for Reciprocity Information, the Inter-departmental Committee on Chemical Statistics, and the Executive Committee on Economic Foreign Policy.

The first committee holds extensive hearings on the items proposed for trade agreements. These hearings in which the principal interested parties testify, develop a great deal of information. The Interdepartmental Committee on Chemical Statistics acts in an advisory capacity to the Government in matters pertaining to chemicals. The commodity specialists of the Tariff Commission have had an important part in preparing the "Standard Commodity Classifications."

WORK OF THE TARIFF COMMISSION

The essence of the Tariff Commission's work of determining the effects of the Tariff Act is development of information on the competition between imported and domestic products.

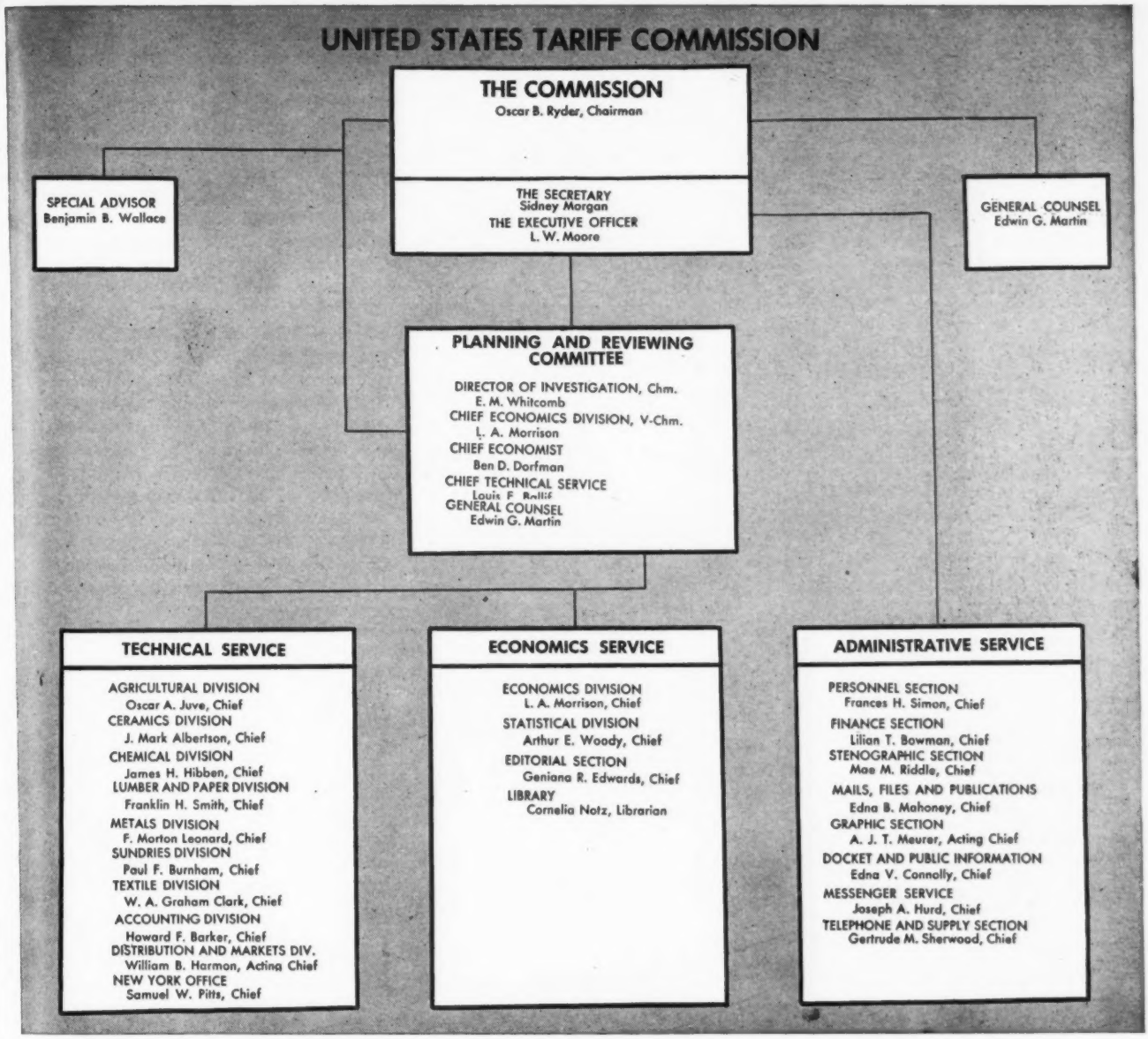
The Commission's economists have made a number of studies of the industry and trade of foreign countries, with particular reference to their tariffs and to ours. Among such studies are those covering Japan, the Philippines and several Latin American countries.

The Legal Department has to do with the administrative provisions of the Tariff Act—classification, valuation, drawback of duty, etc., and keeps posted on all changes in duty made by the Customs Courts.

The wealth of information in the Tariff Commission's commodity and economic files is drawn on at frequent intervals to prepare the great variety of reports required of the Commission. Some of these reports concern various aspects of the Trade Agreements program, such as "Major import articles in relation to trade agreements" and "Effect of trade-agreement reductions on tariff levels in the United States." Other reports include the series on "U. S. industries affected by the War" and the numerous special documents prepared for the war agencies and other government bureaus.

As a basis for judging the competitive conditions of foreign and domestic indus-

E. M. Whitcomb, Director of Investigation and chairman of Planning and Reviewing Committee; L. A. Morrison, Chief, Economics Division; L. S. Ballif, Chief, Technical Service.



tries, the Commission has prepared "Summaries of Tariff Information" on thousands of products. These studies include descriptions and uses, methods of production and use, output, organization and location of the U. S. industry, the foreign industry and world trade, U. S. imports and exports, tariffs, taxes, prices, wages (when available), transportation and the competitive situation.

This series of summaries first appeared in a 2500-page document when the Tariff Act of 1922 was under consideration and a revision was issued when the Tariff Act of 1930 was before Congress. Although the summaries have not been issued in recent years, they are kept up-to-date in manuscript form in the Commission's files, and general revisions are made from time to time when changes in output, production methods or competitive factors affecting the industry warrant.

For the purpose of these summaries, the Commission assembles information from numerous government sources, both U. S. and foreign, from trade journals, directories, and other publications. This background material is supplemented with a great deal of original information obtained from producers and importers, by correspondence, questionnaires, and field trips. Among government bureaus which study commodities, the Tariff Commission is almost unique in the inclusion, in some cases, of production costs in its investigations.

PUBLICATIONS

Since its organization in 1917, the Commission has issued over 500 printed reports. Approximately 400 of these concern commodities or industries and cover some 700 individual items or industrial groups. In addition to the printed reports, the Commission has reproduced much necessary material by office-duplicating processes.

In the typical year 1940 the Commission distributed 10,865 copies of its printed publications and 35,476 copies of processed material. The Superintendent of Documents in the same year sold 5,700 copies of printed reports of the Commission.

In 1940, an interesting development in the use of radio for informing the public of Government publications was an announcement by the companies that broadcast special programs to Latin America on short-wave bands of the availability, in Spanish as well as in English, of Part I of the report entitled "Foreign Trade of Latin America." As a result of the announcement, over 2,600 requests were received through one broadcasting system.

In addition to reports about commodities, per se, there are many studies which relate to countries (e.g. analyses of their tariffs, trade, and commercial policies) or to the effects of the U. S. Tariff Act, such as results of the trade agreements. Most of these reports also contain a great deal of commodity information. In the following paragraphs some of the more typical reports of the Commission are briefly described and a comprehensive check-list of titles is appended at the end of this article.

The value of the commission's reports to the Industrial market researcher is indicated by the statement of Archie Rob-

CHECKLIST OF REPORTS RELATING TO CHEMICAL AND ALLIED INDUSTRIES

(NOTE: * indicates report is out of print; M.S. indicates Miscellaneous Series; ᴱ indicates report is available only at Govt. Printing Office; ᵗ indicates report is available only at Tariff Comm.)

Report	*Year printed*	*Report designation*	*Price*
Alcoholic beverages (*See also* Whisky, wine, beer, etc.)	*1934	M.S.	15¢
Analysis of imports:			
Of miscellaneous chemicals	ᵗ1931-37		
Beer (*See also* Whisky, wine, etc.)	1935	2d Ser.—98	5¢
Bibliography:			
Raw materials	ᵗ1939		
The tariff (A select list of references)	1934	M.S.	$1.00
Camphor, synthetic	1935	2d Ser.—104	5¢
Cane sugar	*1934	R.P., act of 1930	20¢
Cement:			
Clinker	*1932	2d Ser.—38	5¢
Roman, Portland, and other hydraulic	*1932	2d Ser.—38	5¢
Chalk, ground or precipitated	1930	R.P., act of 1922	10¢
Changes in Import Duties Since 1930 (210 pages)	ᴱ1943		25¢
Supplement to Changes in Import Duties Since 1930 (16 pages)	ᵗ1944		
Chemical nitrogen	1937	2d Ser.—114	25¢
Commodity packaging data	ᵗ1937		
Comparison of Tariff Acts, 1922 and 1930 (by items)	ᵗ1930	M.S.	75¢
Comparison of Tariff Acts, 1922 and 1930 (by parag.)	ᵗ1934	M. S.	20¢
Copper, cost of production	ᴱ1932	2d Ser.—29	10¢
Copper mining industry and the tariff	ᵗ1930		
Creosote oil	ᵗ1932	2d Ser.—42	
Depreciated currency, effect upon imports of wood pulp and pulpwoods	1932	2d Ser.—43	10¢
Differential between raw and refined sugar	*1931	2d Ser.—1	5¢
Domestic value—conversion of rates (complete)	*1932	2d Ser.—45	$1.00
Domestic value—conversion of rates (in 8 parts) including:			
Chemicals, oils, and paints	1932	2d Ser.—46 pt. 1	10¢
Metals and manufactures of	1932	2d Ser.—46 pt. 3	15¢
Sugar; tobacco; agricultural products and provisions; spirits, wines, etc.	1932	2d Ser.—46 pt. 5	10¢
Papers and books	1932	2d Ser.—46 pt. 7	10¢
Excise taxes, imports, exports, domestic production and prices—Petroleum, coal, lumber, copper, certain oils and fats	ᵗ1937		
Excise taxes, imports, exports, production and prices on petroleum, coal, lumber, and copper	ᵗ1939		
Excise taxes on fats and oils and oil-bearing materials	ᵗ1939		
Food, United States Consumption of in Terms of Fats, Proteins, Carbohydrates and Calories, 1939-43, (123 pages)	ᵗ1944		
Gelatin, edible	1931	2d Ser.—13	5¢
Gelatin, inedible	ᴱ1932	2d Ser.—52	5¢
Glass and glassware:			
Cylinder, crown, and sheet	1932	2d Ser.—33	5¢
Flat and related glass products	1938	2d Ser.—123	35¢
Plate	1936	2d Ser.—110	5¢
Glues, gelatines and related products	1940	2d Ser.—135	25¢
Grapes, raisins, and wines	1939	2d Ser.—134	60¢
Graphic analysis of the international trade of the United States, 1932	1934	M. S.	$2.25
Iron and steel: Survey	1938	2d Ser.—128	60¢
Japan:			
Recent development of foreign trade in	ᴱ1936	2d Ser.—105	25¢
United States Imports From and Their Relationship to the Defense Program and to the Economy of the Country (239 pages)	ᵗ1941		
United States Imports of Principal Commodities, 1939 (62 pages)	ᵗ1941		
Laminated products	1934	2d Ser.—82	5¢
Latin America:			
Commercial Policies and Trade Relations of European Possessions in the Caribbean Area (324 pages)	ᴱ1943	2d Ser.—151	40¢
Foreign Trade of Latin America Revised			
Part I—Trade of Latin America With the World and With the United States (100 pages)	ᴱ1942	2d Ser.—146	20¢
Part II—Commercial Policies and Trade Relations of Individual Latin American Countries Volume 1—The South American Republics (304 pages)	ᴱ1942		35¢
Volume 2—Mexico and the Republics of Central America and the West Indies (326 pages)	ᴱ1942		40¢
Part III—Selected Latin American Export Commodities (253 pages)	ᴱ1942		35¢
Graphic Analysis of the Trade of Latin America (54 pages)	ᵗ1940		
Latin America as a Source of Strategic and Essential Materials (397 pages)	ᴱ1941	2nd Ser.—144	50¢
Four series on economic and trade problems of certain Latin American countries[1]	ᵗ1945		
Economic Controls and Commercial Policy in—Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, and Venezuela			
Mining and Manufacturing Industries in—Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela, Costa Rica, Nicaragua, Panama, Haiti, and Argentina	ᵗ1945		
Agriculutural, Pastoral, and Forest Industries in—Chile, Colombia, and Venezuela	ᵗ1945		
Recent Development in the Foreign Trade of—Chile and Venezuela	ᵗ1945		
Leather:			
Calf and kip	*1930	S. Doc.—230	
Pigskin	ᴱ1931	2d Ser.—7	5¢
Malt, barley	1933	2d Ser.—59	5¢
Matches	1935	2d Ser.—94	5¢
Mica industry	ᴱ1938	2d Ser.—130	25¢
Oils, certain vegetable, etc. (copra, coconut oil, palm-kernel oil, palm oil, sesame oil, rapeseed oil, whale oil)	*1932	2d Ser.—41	
Olive oil	1931	2d Ser.—22	10¢
Oxides of iron	1934	2d Ser.—88	5¢
Petroleum, crude, cost of	ᴱ1931	2d Ser.—4	15¢
Petroleum oil, crude and refined	ᵗ1932	2d Ser.—30	25¢

ertson, an authority on federal bureaus, in his book, "The Government at Your Service" (1939).

"Perhaps the most thorough studies ever made of many American industries, not excepting even the labors of the NRA Blue Eagle, are those of the Tariff Commission. The list of surveys includes iron and steel, flat glass, incandescent electric lamps, and a timely study of synthetic resins."

COST STUDIES

During the twenties and early thirties, the Commission made a number of investigations of the differences in foreign and domestic production costs of particular commodities as a background for Presidential decisions to re-adjust rates under the so-called flexible provisions of the Tariff Act. The 112 reports in this series included cresylic acid, methanol, whiting, ultramarine blue, oxalic acid, sugar and molasses, edible gelatin, and olive oil. Other cost studies have been made in response to Congressional request.

REPORTS TO CONGRESS AND THE PRESIDENT

This series of special reports includes studies of vegetable oils, synthetic camphor, creosote oil, petroleum, and phosphate rock.

SURVEYS

This series of comprehensive studies of important products or groups of products comprises 14 reports including Chemical Nitrogen, Synthetic Resins, Wood Pulp and Pulp Wood, Flat Glass, Iron and Steel, Starches, Glue and Gelatin, Grapes and Wines, and Sodium Sulphate.

The comprehensive character of these surveys is indicated by the review of the 300-page "Chemical Nitrogen" report by the well known nitrogen authority, Dr. J. Enrique Zanetti (Ind. & Eng. Chem. News, Ed., **15**, 254, 1937), "This extraordinary document is . . . the most authoritative publication on chemical nitrogen. The mass of detail, historical, statistical, and technical . . . presented in coherent, compact manner . . . makes its ownership a necessity to the chemist, the engineer, the economist, the statistician, the banker and the legislator."

TRADE AGREEMENTS REPORTS

Digests. In connection with the trade agreements, the Commission has published digests of trade data on all commodities on which duty reductions or other concessions were granted by the United States. In the case of The Netherlands (1936), for example, these commodities included ammonium sulfate, amyl alcohol, glycerin, and palm oil. The analysis of the trade agreement with the United Kingdom (1939), contains digests on 35 chemicals.

Industries and Reciprocal Trade Agreements is the title of a comprehensive series of reports issued in 1940 and 1941.

These afford a basis for estimating effects of reciprocal trade agreements on particular industries. Each report summarizes for the industry the principal tariff concessions granted by the United States and the concessions obtained from foreign countries. Among the 30 industries thus considered are: Alcoholic Beverages; Cement and Concrete Products; Fats, Oils, Waxes and Oil-Bearing Materials; Iron and Steel; Leather; Petroleum Products; Paper Base Stock, etc.; Pottery; Starches and Dextrines; and Sugar.

Other trade agreement studies, which reveal the import position of many important products are: "Major Import Articles in Relation to Trade Agreements" (1945); "Effect of Trade-Agreement Reductions on Tariff Levels" (1945); and "Imports in 1939 and Trade Agreement Concessions of the U. S." (1940). References to the vast literature on reciprocal trade, some of which critically considers the situation of chemical commodities, are embodied in a comprehensive report and supplement entitled "Reciprocal Trade—A Current Bibliography" (1937, 1940).

WAR CHANGES IN INDUSTRY SERIES

Prepared at Congressional request, this extremely significant series will cover approximately 75 major commodities or groups of commodities, which have had or may be expected to have, important problems of competition from imports. These reports will review the conditions of production and competition before the war and the changes in these conditions made by the war. They will describe and analyze the problems which are likely to arise after the war because of these changes and also because of the general domestic and foreign economic situation in postwar years. The following reports have already been issued: Raw Wool, Industrial Alcohol, Mercury, Iron and Steel, Rubber, Pottery, Tableware, Sheet (Window) Glass, Magnesium, Aluminum, Dehydrated Vegetables, Cigarette Paper, Refractory Magnesia (Magnesite), and Hides and Skins and Leather. Additional reports in progress include:

Dyes	Nickel
Nitrates	Linseed Oil, et al
Petroleum	Wood Pulp and Pulpwood
Potash	Book Paper
Starches	Newsprint
Cement	Wines
Fluorspar	Rayon, Nylon and other Synthetic Fibers
Oils and Fats	
Abrasives	Plastic Products

TARIFF RATES

The basic United States tariff document is, of course, the "Tariff Act of 1930," published by Congress. Interpretations of this law by the Treasury Department and the courts are published weekly in "Treasury Decisions." Important supplementary

CHECKLIST OF REPORTS RELATING TO CHEMICAL AND ALLIED INDUSTRIES

Report	*Year printed*	*Report designation*	*Price*
Phosphates, crude and superphosphate	1935	2d Ser.—100	5¢
Post-War Imports and Domestic Production of Major Commodities.[2] (1321 pages)	‡1945	2d Ser.—154	$1.75
The above mentioned volume is also available in 9 separate sections as follows:			
Section 1—General Introduction and Summary. (25 pages)	‡1945		10¢
Section 2—Chemical, Oils, and Paints. (231 pages)	‡1945		30¢
Section 3—Earths, Earthenware and Glassware. (110 pages)	‡1945		20¢
Section 4—Metals and Manufactures. (209 pages)	‡1945		30¢
Section 5—Wood and Manufactures. (83 pages)	‡1945		15¢
Section 6—Agricultural and Fishery Products and Beverages. (318 pages)	‡1945		40¢
Section 7—Textile Fibers and Manufactures. (248 pages)	‡1945		30¢
Section 8—Papers and Books. (88 pages)	‡1945		15¢
Section 9—Sundries. (187 pages)	‡1945		25¢
Pottery, household table and kitchen articles of earthenware and of china, porcelain and other vitrified wares	1935	2d Ser.—102	15¢
Rayon Industry, The (237 pages)	†1944		
Reports to President:			
Under section 316, Tariff Act of 1922—			
Synthetic phenolic resin	1931	2d Ser.—3	10¢
Rubber:			
Crude Rubber. (37 pages)	*1939		
Crude Rubber. (39 pages)	†1940		
Possibilities of Producing Rubber in the United States and Rubber Conservation. (14 pages)	†1941		
Rubber. (*See* War Changes in Industry.)			
Schedule A—Statistical Classification of Imports into the United States—Arranged by Tariff Schedules and Tariff Paragraphs of the Act of 1930 (523 pages)	*1940		
Sodium:			
Sulphate	*1937	2d Ser.—124	10¢
Sperm oil and spermaceti wax	1933	2d Ser.—64	5¢
Starches and dextrines	1940	2d Ser.—138	
Statistics on Sugar	†1940		
Strategic and Critical Materials, Current Imports for Consumption. (106 pages)	*1941		
Sugar	*1934	2d Ser.—73	20¢
Sugar, differential between raw and refined	*1931	2d Ser.—1	5¢
Synthetics:			
Dyes and other synthetic organic chemicals in the U. S.—			
1934	‡1935	2d Ser.—101	15¢
1935	‡1936	2d Ser.—115	15¢
1936	1938	2d Ser.—125	15¢
1937	*1938	2d Ser.—132	10¢
Synthetic Organic Chemicals, United States Production and Sales—			
1938	‡1939	2d Ser.—136	10¢
1939	*1940	2d Ser.—140	
1940	‡1942	2d Ser.—148	10¢
1941-1943	1946	2d Ser.—153	30¢
Synthetic Organic Chemicals, United States Production, Consumption and Stocks (monthly releases—Facts for Industry Series)	1944 1945		
Preliminary reports—			
1941	†1942		
1942	†1943		
1943	†1944		
1944	†1945		
Synthetics:			
Resins and their raw materials	1938	2d Ser.—131	25¢
Tiles:			
Earthen, Floor and Wall (158 pages)	‡1941		25¢
Trade agreements:			
Digest of trade data and other information concerning trade agreements with—			
Belgium	†1935		
Brazil	†1935		
Canada (1st agreement)	†1936		
Canada (2d agreement) (4 Vols.)	†1938		
Czechoslovakia	†1938		
Finland	†1936		
Netherlands	†1936		
Sweden	†1935		
Switzerland	†1936		
Turkey	†1939		
United Kingdom (8 Vols.)	†1938		
Industries and Reciprocal Trade Agreements—The data in this series of reports afford a basis for estimating effects of reciprocal trade agreements on a particular industry. Each report summarizes for the industry the principal tariff concessions granted by the United States and the concessions obtained from foreign countries[3]	†1940 and †1941		
Reciprocal Trade—A Current Bibliography—Supplement. (232 pages)	†1940		
United States—Philippine trade	*1937	2d Ser.—118	20¢
War Changes in Industry Series[4]			
Mercury—No. 4. (21 pages)	†1944		
Rubber—No. 6. (102 pages)	‡1944		20¢
Sheet (Window) Glass—No. 9. (41 pages)	†1945		
Magnesium—No. 10. (45 pages)	†1945		
Cigarette Paper—No. 11. (16 pages)	‡1945		10¢
Refractory Magnesia (Magnesite)—No. 12. (55 pages)	‡1945		15¢
Hides and Skins—No. 13	†1946		
Aluminum—No. 14	†1946		
Whisky, wine, beer, and other alcoholic beverages and the tariff, report on	1935	2d Ser.—90	10¢
Wood pulp and pulpwood	1938	2d Ser.—126	30¢

[1] Reports have been issued for countries listed. Work on others is in progress. There will be approximately 50 reports when the four series are completed.

[2] This report, which was prepared in response to Senate Resolution 341, 78th Congress, is a reprint of Senate Document 38, 79th Congress.

[3] The industries included in this series are—Alcoholic Beverages, Cement and Concrete Products, Fats, Oils, Waxes, and Oil-Bearing Materials, Fishery Products, Glass and Glassware, Iron and Steel, Leather, Petroleum Products, Pottery, Sugar.

[4] This series, when completed, will consist of about 75 reports. The study was undertaken at the request of Congressional Committees.

and interpretive documents, which should be used with these, are the Tariff Commission's reports, "Tariff Changes, with Supplements" and "Comparison of Tariff Acts (of 1930 and 1922)," which include an index invaluable for finding the tariff classifications of individual products covered by group names.

The official tariff rates are not the whole story, however, as some products are subject to excise taxes, if imported. Even some products which are free of duty are subject to these "excise taxes on imports" —as is the case with imports of copper sulphate, on the Free List, but subject to an excise tax of 4 cents per pound of copper content. The Commission has aided study of this complicated rate setup with its report, "Excise Taxes, Imports, Exports, Domestic Production and Prices—Petroleum, Coal, Lumber, Copper, Certain Oils and Fats," 1937, and similar reports in 1939.

"CENSUS OF DYES"

One of the outstanding statistical publications of the Federal Government is the Tariff Commission's annual report, "Synthetic Organic Chemicals, U. S. Production and Sales," which has been published for 28 consecutive years. This justly famous "Census of Dyes," as it was known until the new title was adopted a few years ago, records the history of the synthetic organic chemical industry from its small operations of World War I to its vast and intricate operations of the present time.

For thousands of products, this report presents data on total production, sales quantities, values and unit values, and names of producers. This last and extremely valuable feature, which keys the names in the Directory of Manufacturers to the thousands of products listed, is probably not to be found in any statistical report of similar breadth, issued by any nation. To meet the special tariff problems involved, synthetics of coal-tar origin were for many years segregated from the noncoal-tars, but recent large scale production of cyclical compounds from other raw materials has led to adoption of a more elaborate and much improved classification by chemical structure.

Group and subgroup totals are shown for crudes, intermediates, dyes, lakes and toners, medicinals, plastic materials, plasticizers, surface active agents, other textile chemicals, tanning materials, flavor and perfume materials, rubber-processing chemicals, and elastomers. Crudes and raw materials for synthetic chemicals derived from petroleum have been separately presented during the last few years.

The elaborate classification by uses is illustrated by the break-down of the Rubber-Processing Chemicals figures into: Accelerators, Antioxidants, Tackifiers, Peptizers, Inhibitors, and Other Uses. The statistical data are accompanied by discussions highlighting the year's developments in each field.

The Statistical Report Form. The amount of detail required to statistically measure the highly ramified and swiftly changing synthetics industry is little short of appalling! The statistical report form (questionnaire) for 1945, supplied in 16 sections, aggregates over 300 pages, listing thousands of chemicals, synonymous names, and classifications. This is a very significant indication of the vast volume of work performed by the small staff that gets out this report. For those making extensive use of the "Synthetic Organic Chemicals" report, careful study of this report form greatly aids understanding of the ways in which the statistics are put together into the various totals.

Because of the inherently complicated character of the synthetics industry, the Tariff Commission's questionnaire employs the Chemical Abstracts system of nomenclature. This tends to reduce misunderstandings formerly caused by the use of trade names, common names, U. S. Pharmacopoeia names and Geneva System names. Equivalents of thousands of these terms are listed in the glossaries of this report form.

For dyes which have no Color Index number, American or equivalent names are listed with their foreign prototype names and numbers. In the simpler field of intermediates, the glossary shows, for example, chloroxylidenesulfonic acid should be reported where the questionnaire calls for 6-Amino-3-Chloro-2, 5-Xylene-Sulfonic Acid and that 4-Nitrodiphenylamino-2-Sulfonic Acid is reportable as 2-Anilino-5-Nitrobenzenesulfonic Acid.

In order to release information as promptly as possible for the use of the synthetic chemical industry, the Commission issues a processed preliminary report some months ahead of the final printed report.

STATISTICS ON IMPORTS OF SYNTHETICS

The above report formerly included extensive statistics on imports. During World War II, imports were small and statistics were abridged. Before 1942, the Tariff Commission cooperated with the U. S. Department of Commerce in compiling data from original customs documents on coal-tar intermediates and finished coal-tar products. These statistics were formerly released semi-annually by the Department of Commerce in Import Statement No. 2865. This statement showed imports of dutiable coal-tar products in far greater detail than in the annual publication, "Foreign Commerce and Navigation of the United States."

Since 1941, the Tariff Commission has compiled these statistics principally for the use of the war agencies. These figures were issued in the Commission's processed releases entitled "U. S. Imports for Consumption of Dyes, Aromatic Chemicals, Medicinals, Intermediates, and Other Coal-Tar Products in Paragraphs 27 and 28 of the Tariff Act of 1930." These releases cover quarterly and semi-annual periods from October 1941 forward.

In 1944, figures were shown for imports of 291 dyes. The analyses also revealed large imports from Canada of TNT, ethylbenzene, styrene, and dibutyl phthalate.

Monthly Statistics of Synthetics Production were initiated in 1942, in cooperation with the War Production Board. Entitled "Facts for Industry, Series 6-2," these releases presented figures on production, consumption, and stocks of 25 synthetic organic chemicals. In the postwar period, this monthly series presents statistics of production of about 50 synthetics, a number of which are "index chemicals," used in official production indexes.

Miscellaneous Imports. Among the reports issued periodically by the Commission are those on imports of crude drugs and miscellaneous chemicals covered by the general, or "basket clause" statistical classifications. These data, which are not available elsewhere, are of special interest to domestic producers and importers of these products.

LOCATION AND ORDERING

The catalog "Publications of the Tariff Commission" and its supplements, which are available free of charge from the Commission, present finding guides under three arrangements. Group A is an alphabetical arrangement of all items included in reports of the Commission. Group B is an arrangement of the commodity reports according to schedules of the tariff act. Group C is an alphabetical arrangement of the reports that cannot be classified in the commodity group. In addition to listing the subjects covered by the reports of the Commission, this revised index also includes the year printed, the report designated, and the price of the reports that are on sale by the Superintendent of Documents of the Government Printing Office. In groups B and C the number of pages in a document is given.

Mailing list. Any one may be placed upon the Commission's mailing list to receive notices of publications as issued, press releases, announcements, etc. Concerns and responsible agencies especially interested, upon application, may receive periodical publications. Because of limited funds, the Commission is unable to send all its publications to any one wishing to place a blanket order for the same.

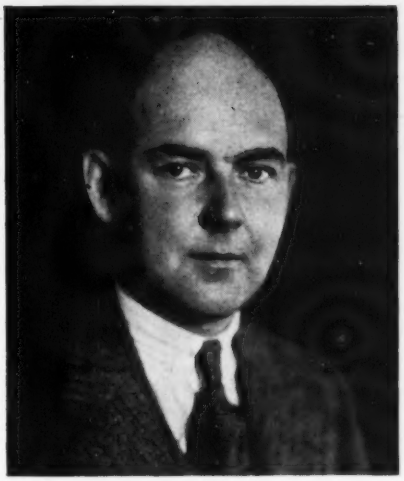
The Commission's principal reports are available in depositary libraries, but some of the processed publications are not kept by these libraries.

LIBRARY FACILITIES

To serve the staff of technical experts, economists, and legal specialists in their studies, a research library is maintained consisting of approximately 55,000 books and pamphlets dealing primarily with the

(Turn to page 857)

HEADLINERS in the NEWS



ARTHUR O. PONDER, elected president, Dominion Tar & Chemical Co. Previously vice-president, he will direct operations of this major Canadian concern and subsidiaries.

GEORGE L. PARKHURST, elected president of Oronite Chemical Co., California. Formerly with Standard Oil (Indiana) he joined Oronite seven months ago as vice-president.

ROLLY M. CAIN, promoted to president of Abbott Laboratories, with S. DeWitt Clough advancing to chairman. Specializing in foreign trade he has directed Abbott's exports.

HORACE M. ALBRIGHT, advanced to the presidency of United States Potash Co. to succeed the late Henry McSweeney. He has been with U. S. P. since 1933.

LOUIS B. HOWARD, named chief of the U. S. Bureau of Agricultural and Industrial Chemistry. Dr. Howard, with the Department since 1929, succeeds Orville May.

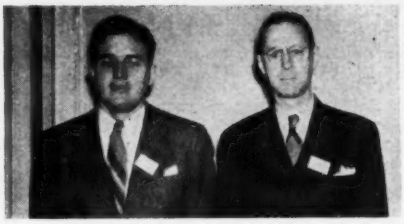
DANIEL B. CURLL, Jr., has joined Commercial Solvents Corp. as assistant to H. W. Denny, sales vice-president. He was formerly with Rumford Chemical Works.

FRANK K. SCHOENFELD, appointed vice-president, (technical) of B. F. Goodrich Chemical Co. Formerly general manager of plants, he joined Goodrich in 1927.

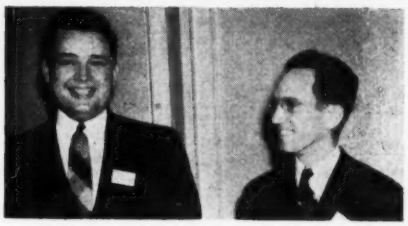
WILBUR A. LAZIER, director of the Southern Research Institute, Birmingham, Ala., has been awarded the 1946 Herty Medal. The presentation took place May 4.

Head table guests at the main banquet, held Apr. 1, are: J. G. Vail, Philadelphia Quartz; D. A. Simmons, former president of the American Bar Association, and featured speaker; E. P. Schoch, University of Texas, and honorary chairman of the meeting; and R. H. Price, Pan-American Petroleum Co., chairman of the south Texas A. I. Ch. E. section.

A. I. Ch. E. Meets At Houston



E. F. Everett and G. A. Vincent, M. W. Kellogg Co., spoke on "Hydroforming for production of high octane motor fuel."



J. E. Swearingen and R. D. Geckler, Standard Oil, Whiting, Ind., discussed the isomate process.

Left to right above, are: authors, C. A. Porter and J. Happel, members of Neches Technical Committee; H. A. Cheney, Shell Development Co.; W. A. Cunningham, University of Texas; H. D. Wilde, Humble Oil Co.; and P. C. Weinert, Universal Oil Products Co. Their papers dealt with: vapor phase isomerization process for manufacture of isobutanes; mineral resources of Texas; and the UOP butane isomerization process.

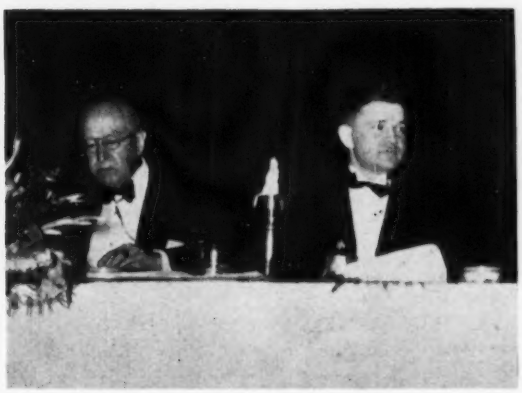
Speakers, F. W. Schumacher, Standard Oil Development; N. Poffenberger, Dow Chemical; Clyde Berg, Union Oil Co.; G. L. Bridger, TVA; Rolland McFarland, Jr., Hills-McCanna Co.; and Wayne C. Edmister, Foster Wheeler Co., discussed, separation of butadiene by azeotropic distillation with ammonia; hypersorption separation of light gases; proportioning pumps; ammonia-synthesis catalysts, and multi-component fractionation design methods.

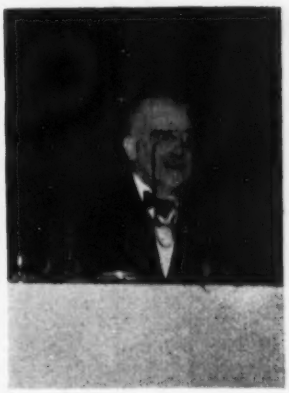
Some of the conventioneers enjoyed a cooling—off-the-program—trip down the Houston Ship Channel after completing plant visits. Here, A. D. Potter, Texas State Dept. of Health; J. J. Ganucheau, Southern Cotton Oil Co.; C. S. Comstock, Monsanto; S. L. Tyler, A. I. Ch. E.; and H. B. Lanreck, Monsanto, relax as "Skipper" J. G. Vail takes the wheel.

ACS Convenes at Atlantic City

More than 7000 members of the A. C. S. journeyed to Atlantic City last month to attend the association's 109th national meeting—the first held since September, 1944. Particular interest was shown in the atomic energy exhibit (above) and the Chemical Education's book display featuring some 450 recent titles.

A main event of the convention was the testimonial dinner tendered to the retiring secretary and business manager, Charles L. Parsons. Bradley Dewey presented Dr. Parsons with the Society's gold medal (left), and a bound volume of letters eulogizing his contributions to U. S. chemical science and industry.





Pictured at the head table of the Parsons' dinner are, left to right: Edward R. Weidlein, director of the Mellon Institute; Eric Rideal, president of S. C. I.; Marston T. Bogert, professor emeritus, Columbia University; H. W. Stoke, president, University of New Hampshire; and Wallace P. Cohoe, past president of the S. C. I. Each spoke on different facets of Dr. Parsons' accomplishments and career.

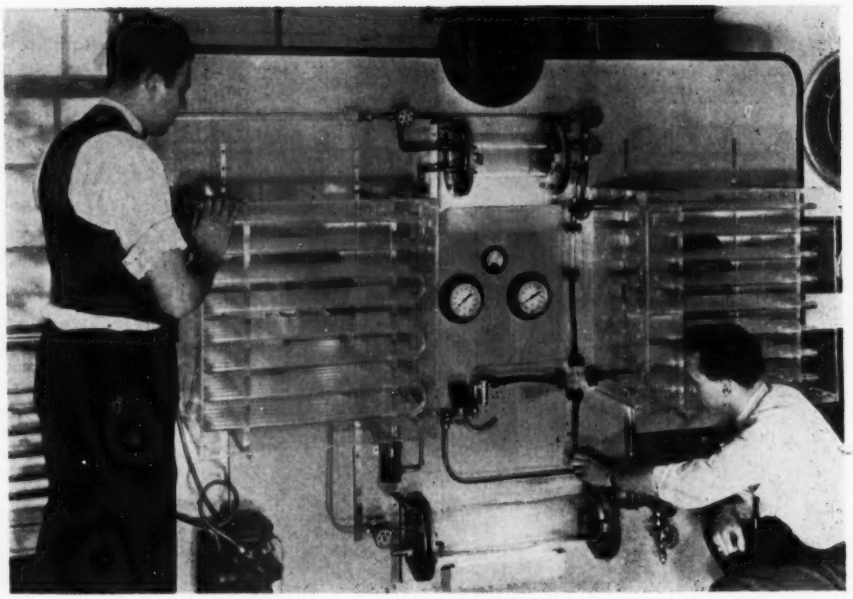
Honored guests at the organic syntheses dinner were (left) L. Ruzicka, Technischen Hochschule, Zurich; Ian M. Heilbron, Imperial College, England; and Tadeus Reichstein, Basel University, Switzerland. At right, Secretary of War Patterson chats with Charles A. Thomas, Monsanto. Dr. Thomas, a director of the ACS, is a member of the government's Atomic Energy Committee.

Hyatt Medal

Edward R. Weidlein, Mellon Institute, holds the gold medals, half of the $1000 John Wesley Hyatt Award, which he presented to Virgil E. Meharg (center), Bakelite Corp., and Paul D. Zottu, consulting engineer. The award followed a dinner held at the Hotel Commodore attended by more than 1,500 members of the Society of Plastics Industry. The Hyatt award, sponsored by Hercules, has been presented annually since 1942 for outstanding achievement in the plastics industry.

Refrigeration Unit

Installed at the Institute of Refrigeration and Air Conditioning, operated by the York Corporation, York, Pa. is the transparent refrigeration system pictured at right. By means of this unit students can actually see the transformation of gas to liquid, and back again, as the refrigerant flows through the transparent evaporator and condenser.



Calco Awards

August Merz, dean of long service employees, receives his 25-year emblem from Calco's general manager, S. C. Moody. Mr. Merz has been associated with Heller & Merz and Calco for 49 years. At the same dinner more than 100 Calco employees were awarded 25-year gold service emblems. They represent but one group of 398 American Cyanamid employees who are being similarly honored.

refer to this

"product list"

of Monsanto

intermediates

helpful in connection with your long-range development plans

For your convenient reference, there follows a partial list of Monsanto intermediates, arranged in alphabetical sequence . . . Not all of these intermediates are presently available. Some are still in critical supply. Experimental samples and prices may be had.

You will find this list of particular value in connection with your long-range development plans. Contact the nearest Monsanto Office, or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Cincinnati, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

PARTIAL LIST OF MONSANTO INTERMEDIATES	
Benzenesulfonic Acid 70-71%	Orthonitrochlorbenzene
Benzoic Acid Technical	Orthophenetidin
Benzotrichloride	Ortho-Vanillin (2 Hydroxy 3 Methoxy Benzaldehyde, Technical)
Benzyl Chloride	Ortho-Veratraldehyde (2, 3 Dimethoxy Benzaldehyde, Technical)
Cyclohexylamine	Paranisidine
Dichloraniline	Parachloraniline
Dichlorphenol	Parachlorphenol
Dicyclohexylamine	Paranitrochlorbenzene
2:4 Dinitroaniline	Paranitrophenol
2:4 Dinitrochlorbenzene	Paraphenetidin
Metachloraniline	Paratoluenesulfonamid
Metanitrochlorbenzene	Paratoluenesulfonchloride
Nitrodichlorbenzene	Phenol USP
Ortho-Aminobicyclohexyl Refined	Phenolsulfonic Acid 65 and 70%
Ortho-Aminobiphenyl Technical	Phosphorus Oxychloride
Orthoanisidine	Phosphorus Trichloride
Orthochloraniline	Phthalyl Chloride
Orthochlorphenol	Salicylic Acid Technical
Orthonitraniline	Sodium Benzoate Technical
Orthonitrobiphenyl Technical	Thiourea
	Toluenesulfonic Acid 94%

MONSANTO CHEMICALS

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BETWEEN THE LINES

Status of Basic Metal Reserves

Iron and aluminum, from a volume standpoint two of the metals most basic to the modern American industrial economy, were consumed in record-shattering quantities during the war. What effect this depletion has had on U. S. (and world) reserves of the two ores has been a subject of considerable speculation. Recent Tariff Commission surveys, covering both present status and outlook, shed some light on the subject.

THE WAR has left a rather broad question in the minds of some geologists and Government agencies as to the extent of depletion that has taken place in essential minerals and ores, and the possible stiuation of the country in the face of future demand on remaining reserves of these ores.

An untold amount of the United States' basic resources in metals and ores has been left spread on the face of the globe and the bottom of its oceans. There was talk at one time of recovering a substantial part of this vast expenditure as battle-field scrap. Now, it appears, this will not be feasible for various involved reasons. Some of these reasons are open to challenge, but apparently they are accepted.

Where then, do we stand? Most concern has been expressed over iron ores—the ores for the nation's basic industry. Apparently the outlook was more alarming during the war than in more recent surveys. A war-time estimate, quoted by the U. S. Tariff Commission in a recent study of the iron and steel industries, was that the known reserves of iron ore in the United States, commercially and economically available, totaled 4.3 billion tons, and potential reserves, though of lower grade ore, up to 75 billion tons.

Subsequently Ernest F. Burchard, of the U. S. Geological Survey, and Albin C. Johnson, of the U. S. Bureau of Mines, estimated U. S. reserves of iron ore of present commercial or usable grade, at 6.2 billion tons, with potential reserves at about 70 billions.

In any case, the Tariff Commission states, the potential reserves of low-grade iron ore deposits in the Lake Superior district alone, are sufficient to supply normal domestic requirements for hundreds of years. Moreover, it is added, estimates of reserves are likely to be revised upward, as current estimates are admittedly conservative and also incomplete.

Aluminum Co. of America

Total world reserves of bauxite are placed at over one million tons, but most of these deposits are outside of the United States.

The Bauxite Picture

It is when the agencies get into bauxite resources of this country that a more cautious picture appears in the official reports. In fact, the Tariff Commission has just completed a study of this situation and states:

"Should there be another war, and should it be prolonged, it is unlikely that a previously acquired stockpile of aluminum would be anything like sufficient to take care of the emergency demand after the initial period."

If foreign bauxite or alumina should be largely cut off, as almost happened at one time in the last war, the Commission warns that "the problem would soon become grave."

The Commission has gone extensively into a number of suggestions for meeting this situation, advanced from various quarters, including Congress.

One such suggestion was that the Government import and maintain a large stockpile of bauxite. The Commission comments that it might be more immediately advantageous to have a stock of aluminum itself.

Another question relates to the Government attitude toward known bauxite reserves in this country. Should the Government take steps to insure their conservation? Since a large part of the better grades of such deposits is privately owned, this involves the further question as to just how the Government might proceed, a question so far not answered.

From another aspect, considerable bauxite of low or medium grade is in the hands of mining companies. Recent indications are that the Surplus Property Board, which has been endeavoring to foster a new series of light metal companies admittedly as competition for old established organizations, may be contemplating drawing on these reserves.

The Tariff Commission observes that if this action is pursued, it "would apparently mean their virtual exhaustion within a relatively few years."

Policy Conflict

There is thus disclosed a hitherto obscure conflict between those intent on spurring competition in the domestic aluminum industry and those, in the same group, who recognize the necessity of conserving bauxite against a future grave emergency.

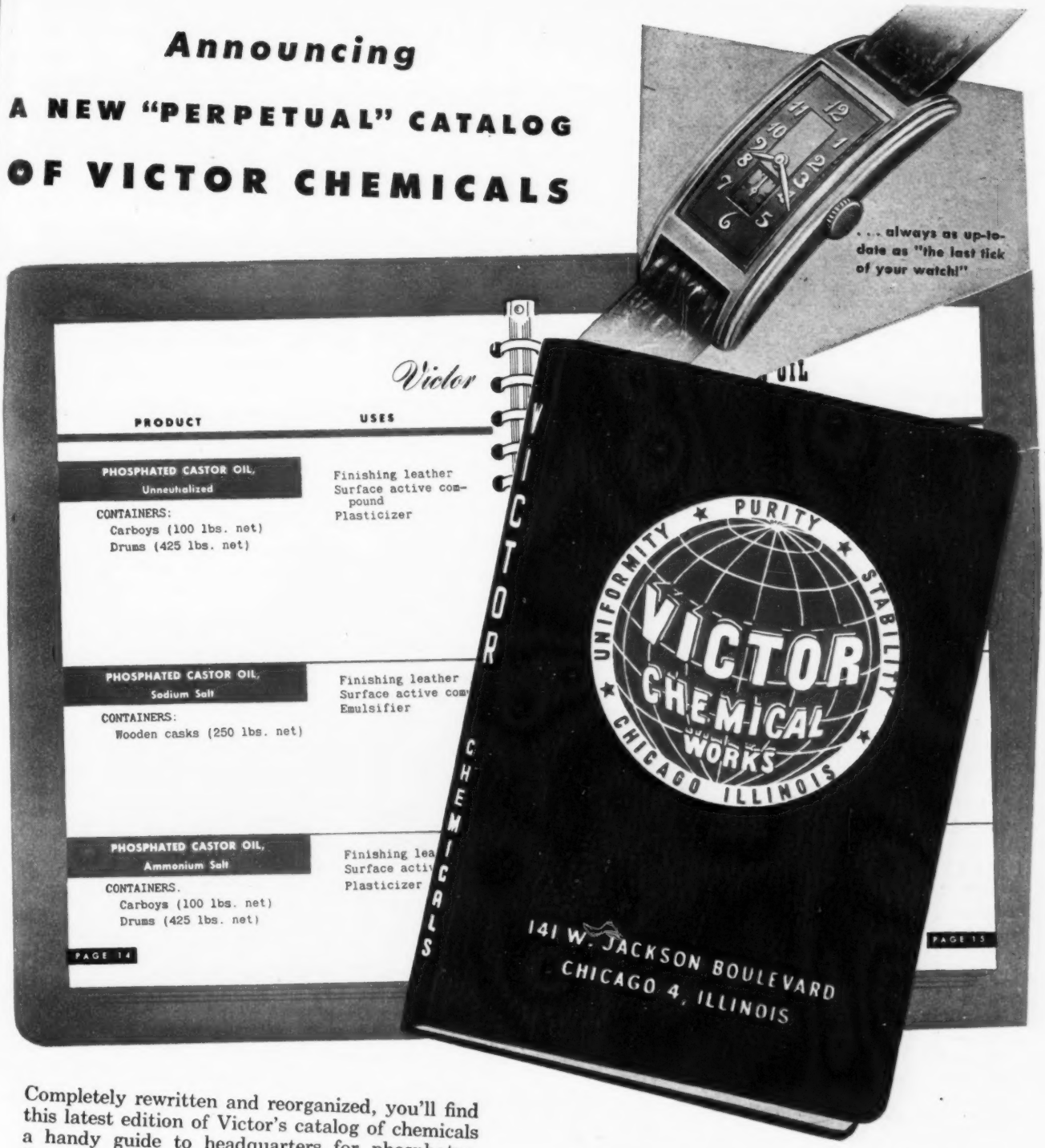
The Commission points out that it would be possible for the Government, either by market negotiation or by condemnation proceedings, to acquire such part of the known bauxite reserves, whether now held privately, or otherwise, as Congress might deem necessary, and to hold the ore off the market as a measure of national security.

This recommendation has only just been made, and has attracted little outside attention for the reason that it is probably not digested as yet by the Congressmen who have seen it. For this reason there has been no reaction reported. However, there are some very obvious implications for private industry in this field, involved

(Turn to page 865)

Announcing

A NEW "PERPETUAL" CATALOG OF VICTOR CHEMICALS



Completely rewritten and reorganized, you'll find this latest edition of Victor's catalog of chemicals a handy guide to headquarters for phosphates, formates and oxalates. Note typical page above . . . how products are arranged into related groups for quick, easy cross-reference of properties.

Another desirable feature is that this new "perpetual" catalog will always be up-to-date "as the last tick of your watch." Replacement sheets, as old products are modified or improved, plus additional sheets covering new products, will be sent to you from time to time. They can readily be inserted into the binder. A personal request on your business stationery will bring a copy to you promptly . . . without obligation, of course.

PARTIAL LIST OF VICTOR CHEMICALS

Acids . . . formic, metaphosphoric, oxalic, phosphoric, polyphosphoric.

Formates . . . aluminum, sodium, sodium boro-.

Metaphosphates . . . aluminum, ethyl.

Orthophosphates . . . ammonium, calcium, iron, magnesium, potassium, sodium.

Oxalates . . . calcium, sodium.

Phosphorus . . . (yellow)

Ferrophosphorus

Phosphorus Compounds . . . chlorides, pentoxide.

Pyrophosphates . . . calcium, sodium acid, sodium iron, tetrapotassium, tetrasodium.

Sulphates . . . magnesium, sodium aluminum.

Wetting Agents

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NEW PRODUCTS & PROCESSES

2-Bromothiophene NP 303

A new bromine product recently announced by the Michigan Chemical Corp. is 2-bromothiophene.

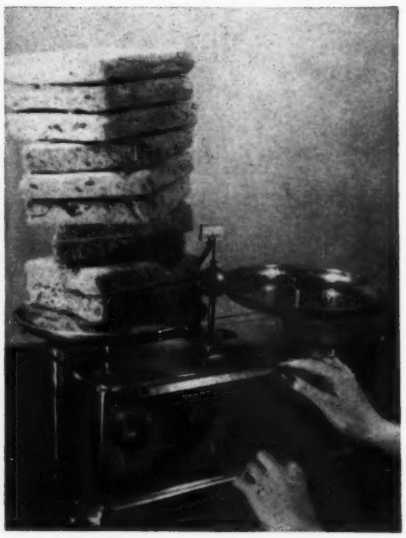
The Michigan firm is the first to produce 2-bromothiophene commercially. Recent interest in thiophene compounds for the pharmaceutical industry prompted this new development, which parallels the recent availability of thiophene to the chemical industry. Replacement of a benzene ring in a therapeutically active compound by the thiophene nucleus has been found to result in an increase in therapeutic activity in many cases, and 2-bromothiophene is of value as an intermediate in the synthesis of such compounds.

Insulating Board NP 304

Glue is the principal raw material required to make more than a cubic foot of a new type insulating board recently developed by Foster D. Snell, Inc. The new product weighs one to three pounds per cubic foot and ranks high among commercial heat insulations. The process of manufacture is simple and yields a board resistant to all destructive agencies. By using different fillers, the characteristics of the product can be varied between wide limits and the curing process imparts to the glue high resistance to water, fungi and other destructive agents. The product is suggested for insulating vehicles, railroad cars, trucks and airplanes wherever extreme lightness is required together with efficient insulation against heat, cold or noise.

The raw materials for "Foamboard," as the new product is called, are mechanically foamed in aqueous solution and then dried to become water-insoluble and non-flammable. The weight can be reduced below one pound per square foot, but is usually above this value. The present raw material cost is under 20c per cubic foot.

By simple changes in manufacture, the size of air cells can be varied over a substantial range. The foam may have compounded with it synthetic rubber, asphalt, wood fibers, glass fibers and many other materials to give special properties desired.



The following table gives a comparison with several well known heat-insulating materials:

	Pounds per cubic foot	*Comparative Heat transfer value, K*
Balsa wood	7.3	0.33
Celotex	13.1	0.34
Hair felt	11.0	0.26
Cellular gypsum	8.0	0.35
Rock wool	6.0	0.26
Felted jute and asbestos	10.5	0.37
Foamboard	1.3	0.30

The material had valuable war applications in aviation and is now available for general manufacture. Because of the extremely light weight, large users will prefer to manufacture the material for themselves under license, rather than to purchase the finished product.

The photograph shows a half pound of one-inch slabs of the material.

N-Containing Alkyds NP 305

Preparation of a new imide-modified alkyd resin which may mark an expansion of alkyds into relatively new fields has been described by the Glycerine Producers' Association. These resins are of particular value in low temperature bakes or air drying and give hard finishes under conditions where melamine finishes do not harden.

Replacement of part of the ester linkages in an aklyd resin with amidic linkages, by replacing part or all of the glycerine with glycerine amine, gives imide modified alkyds, which can be made with a very low fatty acid content and low acid numbers.

Data are available on the preparation of the imide modified resins and on the film forming properties of such resins. Because short oil length imide resins can be made without gelation, and with low acid numbers by this process, fast drying films can be prepared.

Detergent NP 306

Dianol G is a newly developed and versatile liquid detergent and wetting agent recently added to the line of Dianol synthetic detergents and wetting agents by Quaker Chemical Products Corporation, Conshohocken, Pa. When used with alkali builders such as tetrasodium pyrophosphate, Dianol G is said to be one of the most efficient synthetic detergents available, on an applied cost basis, for use on all fabrics. It is rated as outstanding for use on wool fabrics, which it scours very well without builders at a pH of about 9.0. It also rinses from all fabrics with extreme ease and no residual odor.

Dianol G dissolves instantaneously in cold water. It is stable in hard water and in acidic or alkaline solutions of conventionally used concentrations. There is no excessive foaming when it is used in processes involving heavy circulation or agitation.

Silver Recovery NP 307

A large amount of silver is lost continuously in the form of spent photographic solutions. The silver in these solutions is present at low concentrations with an overwheming amount of other salts, mainly hyposulfite with which it forms complex compounds. The recovery of silver from these solutions has been attempted in several, rather expensive ways.

A new method has been developed in

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Please send me more information, if available, on the following items. I understand that nothing further may be available on some of them.

NP 303	NP 307	NP 311	NP 315	NP 318
NP 304	NP 308	NP 312	NP 316	NP 319
NP 305	NP 309	NP 313	NP 317	NP 320
NP 306	NP 310	NP 314		

Name ..... **Position** .....

Company .....

Street .....

City & State .....

Silene EF

Various manufacturers of these synthetics report excellent results with the Columbia pigment, Silene EF. It is particularly useful in compounding white or light-colored stocks requiring high modulus, hardness, tear-resistance and tensile strength.

For example, one manufacturer reports the following, using a formulation of Butadiene-Acrylonitrile Copolymer, 100.0; Zinc Oxide, 5.0; Stearic Acid, 1.5; Sulfur, 1.75; Benzothiazyl Disulfide, 1.5; Dibutyl Phthalate, 12.5; Coumarone-indene-resin (MP = 20° to 30°C.), 12.5; Silene EF, 150.0; and a cure of 45 minutes:

Modulus at 300%	2050 psi.
Ultimate Tensile	2125 psi.
Ultimate Elongation	330%
Shore Hardness	95
Crescent Tear	348

Properties of stocks of lesser loadings and of aged samples were correspondingly satisfactory. The closest approach to a "white carbon black," Silene EF is a white, extremely finely divided, precipitated, hydrated calcium silicate. Its use is constantly expanding for many diversified natural and synthetic rubber products. You are invited to write for information concerning specific compounding problems.

COLUMBIA CHEMICALS

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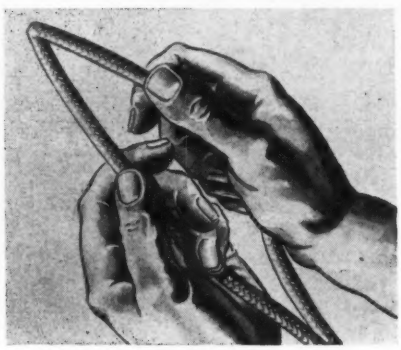
the chemical laboratory of The Timber Engineering Company. It is based on the use of a specially prepared lignin, called Teco-lignin S, and is quite simple in operation. A small amount of the Teco-lignin S precipitates the silver in the form of a quickly settling sludge from which the metal or its salts can be easily prepared. The precipitation can be carried out in most any photographic shop. The silver-rich sludge can then be sent to a recovery plant.

Other valuable metals can be salvaged from dilute, impure solutions in similar manner.

Tubing Varnish NP 308

What is contended by the manufacturers, William Brand & Company, to represent the greatest advance in the art of varnish impregnation of cotton tubing and sleeving for the last half-century is announced as "Turbotuff."

It is pointed out that this development is the result of a varnish impregnation process, as distinguished from the more



conventional lacquer treatment given cotton braided tubing for insulating purposes. The outstanding feature of Turbotuff is the non-cracking characteristic. It is claimed that this non-cracking feature obtains, regardless of the angle of bend to which the tubing may be subjected, or its duration. Beyond the non-cracking property of this new development, there are claimed greatly enhanced dielectric values, decreased moisture-absorption factor, improved resistance to oils, acids, alkalis, and electro-chemical influences. Its neutralization of the ever-present oxidizing process is an outstanding feature.

Anion Exchange Resin NP 309

Development of an improved anion exchange resin with wide usefulness in the fields of water-conditioning and in numerous applications calling for the removal or recovery of acid is announced by Resinous Products & Chemical Company, Philadelphia, Pa. Known as Amberlite IR-4B, this improved resin produces deionized water comparable in quality with distilled water and provides an unusually convenient means of purifying drugs and biologicals by the elimination of acidic contaminants present or introduced during preparation. This unusual property, of particular value in research and analytical laboratories, now is utilized in processing the remarkable new antibiotic, streptomycin.

Amberlite IR-4B, with its outstanding resistance to the leaching action of water, acids and solvents, now replaces Amberlite IR-4 for all industrial applications, its range of usefulness widened in deacidification processes where absence of contaminants in the treated product is essential. The outstanding stability of Amberlite IR-4B is evidenced in its resistance to the aggressive action of formaldehyde and formic acid as well as a variety of chemical reagents and solvents.

Although Amberlite IR-4B is closely related chemically to Amberlite IR-4, its operational characteristics are notably superior. The new exchanger exhibits an increased rate of exchange, thus permitting higher flow rates during operation. Also it can be regenerated at higher rates than those recommended for Amberlite IR-4 and, for certain applications, can be regenerated by strong alkalies such as sodium hydroxide. Other advantages include absence of objectionable color-throwing, lower rinse requirements and reduced packing.

Wetting Agent NP 310

Hartex Duofol L, a sulfated synthetic ester of superior wetting, softening and re-wetting properties has been introduced to the textile field by the Hart Products Corporation.

The new product is a concentrated liquid, miscible with water in all proportions, whose clear solutions and high surface active properties are not affected by hard water, salt, alkali or weak acids.

Duofol L is an outstanding wetting agent even at elevated temperatures and is recommended in vat or pad dyeing and for dyeing operations in general to give greater uniformity of shade. It is very effective in producing controlled shrinkage in sanforizing and in obtaining higher slasher speed and greater loom efficiency in rayon warp sizing. Added to printing pastes, Duofol L improves penetration and gives better fastness to soaping.

The wetting-back property imparted to fabrics by Duofol L renders the fabric highly absorbent. In addition, it acts as a softening agent, making the product doubly desirable in the sanforizing operation. Concentrations as low as 0.04 per cent (about ½ ounce per 100 gallons of solution) have proved satisfactory for most applications.

Silica Increases Cotton Strength NP 311

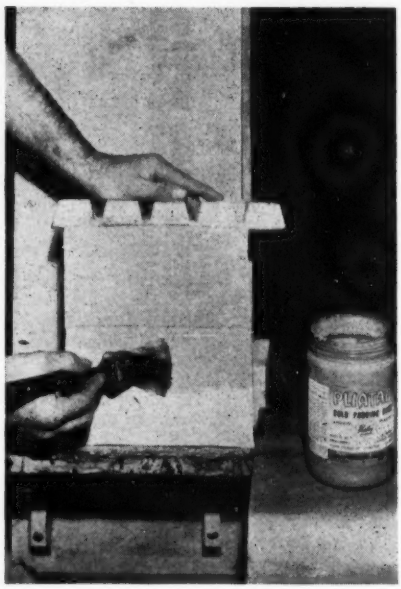
A way to increase the tensile strength of cotton yarns up to 40 per cent has been revealed by Monsanto Chemical Company.

The improvement is effected through mill application of the special submicroscopic collodial silica called Syton, which the company originally announced as a chemical to make sheer stockings run-resistant and to take the shine off serge.

When applied to cotton sliver in concentrations of one to three per cent the inter-fiber friction is increased and it is possible to increase the tensile strength up to 40 per cent and to decrease the twist as much as 40 per cent.

Padding Glue NP 312

As a result of experiments in large and small print shops and binderies with synthetic rubber, resins, animal glues, etc., as a raw material base, Paisley Products, Inc., selected a liquid plastic synthetic resin for the Pliatab cold padding glue formula because of its resistance to extremes of temperature and climatic conditions. The raw material, a war-born



plastic resin, was released by the War Production Board for civilian use at the end of the war.

The use of plasticizing agents overcomes crystallization, hardening and brittleness and also imparts greater covering qualities. According to the manufacturer, one gallon of Pliatab will cover 200 square feet of padding area. The compound can be applied by hand brushing or spray gun, and is available in red and white (natural) colors.

Embossed Vinyl Film NP 313

The Pantasote Company has announced the development of a new unsupported vinyl plastic film known as Pantex, which has been successfully embossed in a variety of rich, natural grainings.

The absence of supporting fabric or paper contributes greatly to softness of hand and freedom from surface roughness arising from unevenness of base. Ease of cutting, tailoring, and fabricating makes possible many unusual and intricate designs. Pantex was primarily developed for use in women's shoes, handbags, belts and trim for fashion acces-

Dependable Chemicals by HEYDEN

Salicylates

In the manufacture of pharmaceuticals, dyes and other commercial products *Heyden* Salicylates and *Heyden* Salicylic Acid have long been recognized for their purity and uniformity. Careful laboratory control by highly skilled personnel assures a finished product of quality and dependability.

Heyden research laboratories give constant attention to developing new uses and applications for Heyden chemicals. This service is available to you in the formulation of your products.

SODIUM SALICYLATE, U. S. P.

METHYL SALICYLATE, U. S. P.

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(10%—16%—20% Starch Granulations)

SALICYLIC ACID, U. S. P.
(Crystals and Powder)

AMMONIUM SALICYLATE, N. F.
(Crystals)

CALCIUM SALICYLATE
(Powder)

LITHIUM SALICYLATE, N. F.
(Powder)

MAGNESIUM SALICYLATE
(Powder)

SALOL, U. S. P.—PHENYL SALICYLATE
(Granular)

STRONTIUM SALICYLATE, N. F.
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sories. However, wide use is being extended to upholstery, decorative wall covering, brief cases, desk sets, desk accessories, book bindings, wallets, change purses and similar items.

n-Heptane NP 314

The availability at comparative low prices in drum or tank car quantities of normal heptane of exceptional high purity has been announced by the Chemical Products Department of Phillips Petroleum Company. This is another addition to the steadily growing list of such materials offered by this concern. Preliminary examination of production stream samples indicate the purity of the normal heptane to be over 99 mol per cent.

The traces of other hydrocarbons in this newly available material are considered to be chiefly 3-methylhexane or methylcyclohexane or both. The normal heptane is segregated from straight run and natural gasolines by elaborate distillation procedures.

The manufacture of pure normal heptane is an outgrowth of the prior development of a less pure grade of normal heptane for solvent uses, a product which has found large scale application. Interesting possibilities immediately suggest themselves for more exacting solvent applications with this very pure normal paraffin hydrocarbon boiling at 98° C. Likewise the chemical possibilities of this pure straight chain paraffin hydrocarbon may be of importance. A long accepted use of pure normal heptane is as a primary knock testing reference fuel.

Water-Dispersible Metallic Soaps NP 315

A new water-dispersible metallic soap, known as Nopco 1097, is proving an important factor in the manufacture of cement, neoprene adhesives, coated paper and certain types of cosmetics, according to Dr. Edwin A. Robinson, Technical Director, Industrial Department of National Oil Products Co., chemical manufacturers, of Harrison, N. J.

The new Nopco 1097 group consists of various metallic soaps such as those of zinc, aluminum, calcium, lead and magnesium, blended with an emulsifier. The resulting products are, in general, water dispersible, semi-fluid white pastes containing approximately 45 per cent solids.

The most outstanding property of this group of metallic soaps is the ability to disperse readily in water. This property opens up new fields of applications which were heretofore impossible due to the water insolubility of metallic soaps, Dr. Robinson said.

The semi-fluid white pastes prepared with Nopco 1097 may be diluted with water to any desired concentration, it was pointed out. The pH of a 5 per cent dispersion averages between 7.5 and 8.0. Since the emulsifier is essentially inert, the dispersion is fairly stable to dilute alkalies, but not to strong acids, since the latter react with the metallic soap.

Koroseal Flooring NP 316

A new type of hard-surface floor covering, manufactured by Sloane-Blabon Corporation of Trenton, N. J., under technical supervision of the B. F. Goodrich Company and using the latter's raw material Koroseal, is being put on the market by the flooring company.

The material embodies all of the qualities of durability, flame-resistance, colorability and resistance to wear and weather for which Koroseal is noted in many other applications. It is a form of the familiar plasticized polyvinyl chloride, unsupported by any fabric, and is available in square flexible tile form and in a wide range of brilliant solid colors.

It is somewhat higher priced than linoleum and its market will be principally in hotels, hospitals, offices, ships, theaters, residences, airports, food-processing industries, and generally where long wear and minimum maintenance are of greater importance than original cost. It will be formally introduced at the midsummer furniture markets.

Koroseal floor covering has been in joint development by B. F. Goodrich and Sloane-Blabon since early in 1940. In one test simulating the "denting" effect of furniture casters, the Koroseal showed but one-half of one per cent deformation after 54,000 strokes, whereas the best of conventional hard-surfaced floor materials had been broken up at 17,000 strokes.

Ethyl Silicate NP 317

Ethyl silicate 40, a new condensation product containing approximately 40 per cent available silica, is now available in tank car lots from Carbide and Carbon Chemicals Corporation, a Unit of Union Carbide and Carbon Corporation.

This new polymer is a light-brown, mild-odored liquid which undergoes the hydrolysis and subsequent dehydration characteristic of pure tetraethyl orthosilicate. It deposits silica at much lower costs than other ethyl silicates. This convenient source of adhesive silica is of particular interest as a refractory particle binder, for weather-proofing stonework, for formulating special heat-resistant surface coatings. It is also useful for gelling such liquids as acetone, ethanol and isopropanol to make "solid fuels."

Silicone Anti-Foam Agent NP 318

DC Antifoam A, a new Dow Corning silicone product, has recently been developed and is now commercially available. Tests have proved its effectiveness in eliminating foaming problems as difficult to control as those which occur during

SUPPLIERS SINCE 1838

COCOANUT OIL
Castor Oil
Corn Oil
Cottonseed Oil
Olive Oil and Foots
Peanut Oil
Rapeseed Oil
Sesame Oil
Sunflowerseed Oil
Lard Oil
Neatsfoot Oil
Tallow and Grease
Lanolin and Wool Fat

FATTY ACIDS
Red Oil
Special White Oleine
Stearic Acid
Rufat
Cocoanut F. A.
Corn F. A.
Cottonseed F. A.
Linseed F. A.
Peanut F. A.
Soya F. A.
Tallow F. A.

White Mineral Oil - Petrolatum - Superfatting Agent

VODOL A maize phosphatide which lowers surface and interface tension of oils and fats, stabilizes and prevents reversion, increases penetration and spread.

Soda Ash
Caustic Soda
Modified Soda
Sodium Metasilicate

Trisodium Phosphate
Disodium Phosphate
Monosodium Phosphate
Tetrasodium Pyro Phosphate

THE LAMEPONS unique surface active agents; prolific foam; high detergency and emulsifying powers; suitable for cosmetic and industrial use.

QUADRAFOS a stable polyphosphate for water conditioning and mild but effective detergency.

Starch and Dextrine

WELCH, HOLME & CLARK CO., INC.
563 GREENWICH STREET, NEW YORK 14, N. Y.

the steam distillation or vacuum concentration of various aqueous alkaline solutions and emulsions.

DC Antifoam A has been tested and found effective in very low concentrations ranging from 1 part in 10,000 against strong foamers to 1 part in 1,000,000 against weak foamers. Among the solutions and emulsions in which DC Antifoam A is effective are: alkaline black liquor, rosin soap solutions, sodium oleate and sodium alkyl sulfate solutions, Aerosol OT, cutting oil emulsions, egg albumin, and various synthetic rubber latices.

Structural Plastic NP 319

A new resin, reinforced with glass fabric or other materials, makes structural panels which are undergoing tests for automobiles, airplanes, refrigerators and washing machines.

The new resin, known only as BCM, is announced by E. I. du Pont de Nemours & Company. This resin has excellent bonding properties and high resistance to heat.

Plastics fabricators are testing the material to determine its suitability in the manufacture of such diverse products as transparent coatings for wood veneers, tooling jigs, structural panels for automobiles, airplanes, refrigerators and washing machines, entire sections of sinks, and decorative panels. Production, however, is still in the semi-works stage.

The liquid resin is used chiefly with glass fabric laminates at present, although it may also be applied to paper, hemp, wood, and various cloths. It requires only a short curing period and low laminating pressure, and can be used as an impregnating and laminating resin either by itself or mixed with a polymer. In the cured state, BCM has no odor and is resistant to most organic materials. Absorption of water, and other common solvents such as acetone and ethanol, is very low.

The new resin is thermosetting, and it has a permanent high-gloss finish. In addition, thin veneers to which BCM has been applied can be bent without crazing or peeling the resin. A wide range of colors can be obtained by adding oil-soluble dyes or pigments to the resin. Cast BCM may be worked with high-speed tools easily by the same methods as used for methacrylates.

Resin Catalyst NP 320

A catalyst to speed up action of thermosetting resins used in finishing tetiles is described by American Cyanamid Company's Textile Resin Department.

Known as Aerotex Accelerator 187, the product is an acid salt buffered to give maximum stability and optimum pH. Soluble in water, Aerotex Accelerator 187 is added to the resin bath just before it is ready for use on fabrics. The solution, which is odorless, acts to hasten the polymerization of the resins.

A Low Cost GRIGNARD REAGENT

$CH_3Cl + Mg \xrightarrow[dry]{ether} CH_3MgCl$

with ANSUL Methyl Chloride

YIELDS—Excellent, better than 90%.

REACTION—Proceeds smoothly, rapidly, and is easily controlled. Can be carried on at atmospheric pressure and slightly above room temperature.

APPARATUS—Simple and inexpensive.

ANSUL CH_3Cl—Now a low cost chemical due to greatly expanded production facilities.

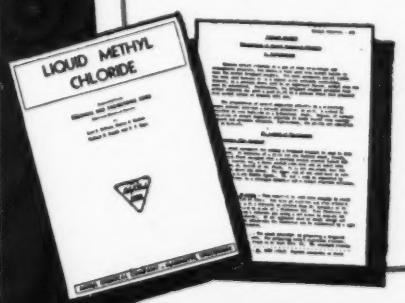
MAGNESIUM—Readily available and now relatively inexpensive.

CONCLUSIONS—Excellent yield, smooth reaction, inexpensive methyl chloride and magnesium . . . make a Low Cost Grignard Reagent.

LIQUID Methyl Chloride by ANSUL*

PHYSICAL PROPERTIES

Chemical formula	CH_3Cl
Molecular weight	50.491
Color (gas or liquid)	Colorless
Odor	Ethereal, non-irritating
Melting point	−144° F. (−97.6° C.)
Boiling point	−10.65° F. (−23.7° C.)
Critical temperature	289.6° F. (143.1° C.)
Critical pressure	962.2 lbs. per sq. in. abs.
Solubility	Methyl chloride in water—3 to 4 volumes methyl chloride vapor in 1 volume of water at ordinary temperatures and atmospheric pressure—methyl chloride in alcohol—readily soluble
Specific gravity of liquid	.909



Send for Bulletin No. 900

"Preparing Methyl Grignard Reagent with Methyl Chloride" . . . and for "Liquid Methyl Chloride"—a treatise on the properties and general handling of Ansul Methyl Chloride.

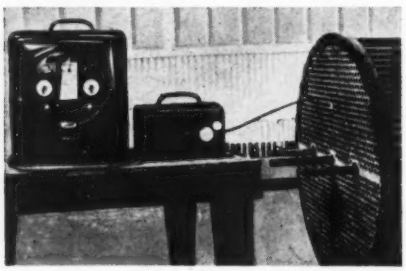
*REG. U. S. PAT. OFF.

ANSUL CHEMICAL COMPANY
INDUSTRIAL CHEMICALS DIVISION, MARINETTE, WIS.
Eastern Office: 60 E. 42nd St., New York City

NEW EQUIPMENT

Heat Exchanger Tube Inspection QC 819

The new Probolog of the Shell Development Co. detects and records quantitatively all types of irregularities in tubes of non-magnetic metals. It is portable, operable by one man and inspects the tubes from the inside, thus requiring no



preparation of the heat exchanger equipment other than removal of the heat exchanger head.

In its present commercial form the Probolog consists of one or more interchangeable probes of diameters to fit standard sizes of tubing, a mechanical probe puller which is synchronized with the strip chart drive of the electronic recorder so as to insure a reproducible record; and a neon blinker for use as an indicator when a record is not required.

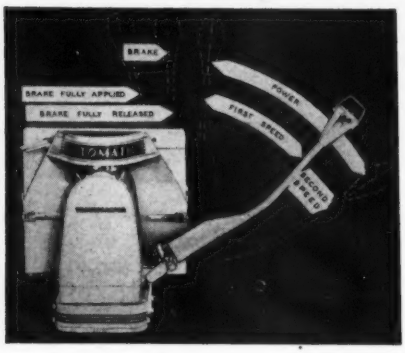
The present instrument is operable only on non-magnetic tubes and, for basic reasons, is unsuitable for the examination of non-magnetic metals such as carbon steel tubes. However, the company reports that a modified instrument adapted to magnetic metals is under development.

The standard commercial model uses 110 volts single phase 60 cycles A. C. as a power source although it may be adapted to any situation. No other outside connection is necessary.

Metallic baffles and tube sheets are shown on the record by wide swings of the recording pen. The large amplitudes of these deflections and regularity of their spacing permit proper allowances to be made. The strip chart record thus obtained provides a permanent record of tube condition.

Hand Tractor QC 820

The Transtractor, a new electric-propelled hand tractor combining the features of the electric hand truck and the conventional warehouse tractor, has been announced by Automatic Transportation Co. The Transtractor will push or pull



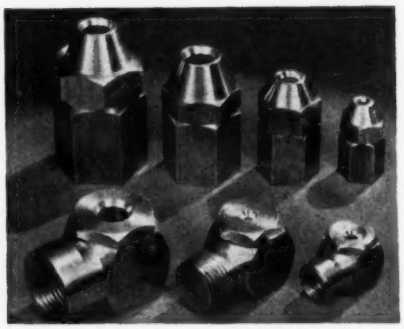
a 6,000-pound trailer load all day or up to 20,000 pounds intermittently, depending upon plant conditions. Finger-tip control enables one man to handle any size or type of load with facility.

The Transtractor was designed specifically for applications requiring a towing type unit but demanding smaller and more maneuverable equipment than standard electric tractors. By towing a number of trailers in tandem, the Transtractor allows individual items to be loaded separately reducing the handling over that required when a hand truck is used.

Equipped with front-wheel drive the Transtractor is the most maneuverable equipment of its type designed for close-quarter operation. Forward and reverse drive controls are push-button type operated from the guide handle. Two forward and two reverse speeds are controlled by the vertical angle of the guide handle. Drive brakes are applied by the return of the guide handle—which springs upright when released.

Spray Nozzles QC 821

The spray nozzles illustrated in the accompanying photograph are the first to

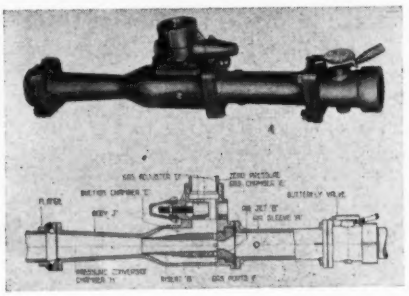


be developed by the Delavan Engineering Co. The back row of nozzles shows types WS and WSS nozzles. Type WS produces a hollow cone spray and Type WSS a full cone spray. They are offered with both female and male pipe threads in ¼", ½", ¾", and 1" sizes and for a range of capacities from .15 gpm to 24 gpm.

The nozzles shown in the foreground of the photograph are type WR, now available in ¼", ½", and ¾" pipe sizes both male and female threads, over the same range of sizes.

Constant Ratio Gas-Air Mixer QC 822

The production of a newly designed constant-ratio mixer for low pressure air and gas with an efficiency of almost 50



per cent greater than that of presently available equipment is announced by the Industrial Division of Bryant Heater.

First of a series of new gas combustion elements for use in industrial process equipment, the Flomixer utilizes the energy of a stream of air at pressures up to 3 pounds to entrain a combustible gas and to deliver the mixture at unusually high pressure to the burners.

Available in pipe sizes from ¾" to 4",

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. (5-6)

Please send me more detailed information on the following new equipment:

QC 819	QC 823	QC 827	QC 831	QC 836
QC 820	QC 824	QC 828	QC 832	QC 837
QC 821	QC 825	QC 829	QC 833	QC 838
QC 822	QC 826	QC 830	QC 834	QC 839
			QC 835	QC 840
				QC 841

Name .....

Company .....

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The material in a valve must suit the service. POWELL *has all kinds!*

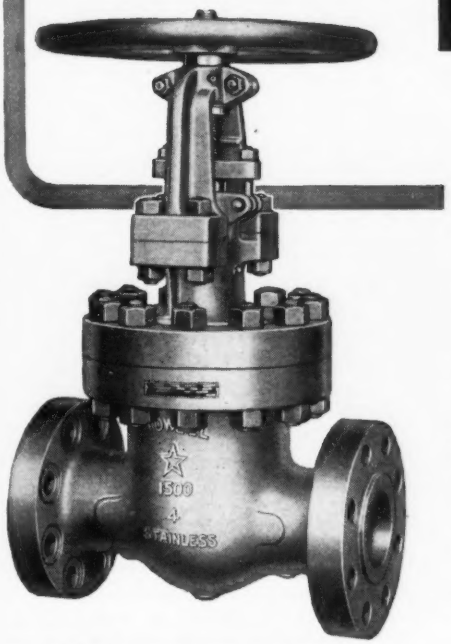


Fig. 1303 S. S.—Class 1500-pound Stainless Steel Gate Valve with flanged ends, outside screw rising stem, bolted flanged yoke, taper wedge solid disc. Specially adapted for handling high temperatures (up to 1400 F).

100 YEARS in the School of Experience has taught us many valuable lessons. Not the least of these is the importance of using the *right* valve in the *right* place. Not only type and design but *material* as well must be "just what the doctor ordered."

This is especially true in the Chemical and Process Industries. In no other industry is there such a great variety of service conditions under which valves must operate.

The Complete Powell Line includes Bronze and Iron Valves for every service where these valves are applicable; Cast Steel Valves of every necessary type and design in pressure classes from 150 to 2500 pounds; Alloy Steels for high temperatures and a notable line of Valves for Corrosion Resistance in many special patterns and the widest range of Pure Metals and Special Alloys ever used in making valves.

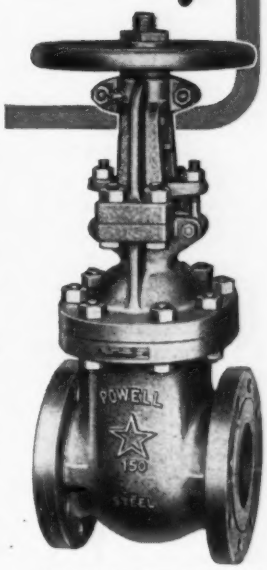


Fig. 1503—Class 150-pound Cast Steel Gate Valve. Has flanged ends, outside screw rising stem, bolted flanged yoke, taper wedge solid disc.

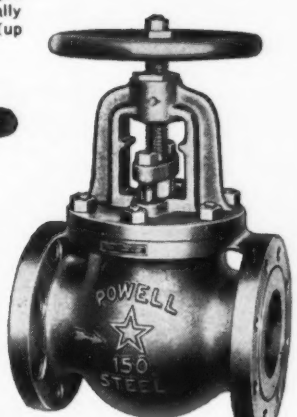


Fig. 1531—Class 150-pound Cast Steel Globe Valve. Has flanged ends, outside screw rising stem and bolted flanged yoke.

Fig. 3061—Class 300-pound Cast Steel Swing Check Valve. Flanged ends and bolted cap. Disc has ample lift to permit full, straightway, unobstructed flow through the valve body.

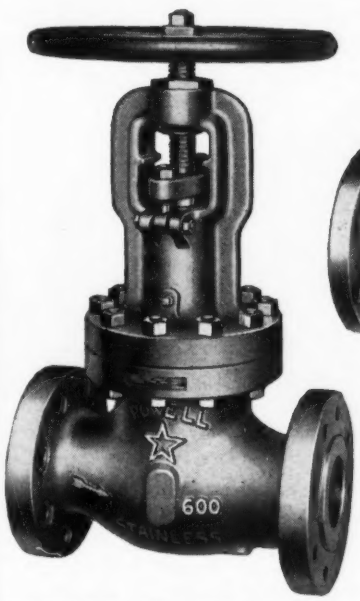


Fig. 6031 S. S.—Class 600-pound Stainless Steel Globe Valve with flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc. Specially adapted for handling high temperatures (up to 1400 F).

Catalogs on Request. Kindly specify whether you are interested in Bronze and Iron; Cast Steel; or Corrosion Resistant Valves.

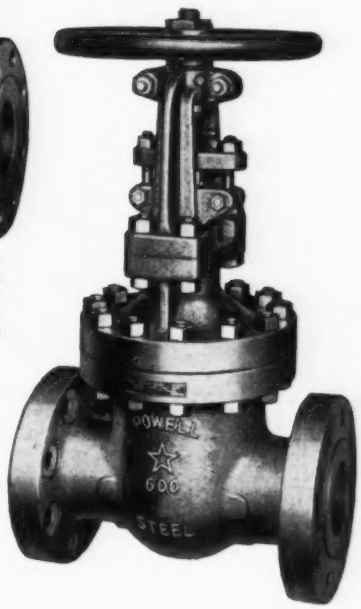


Fig. 6003—Class 600-pound Cast Steel Gate Valve. Has flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc.

The Wm. Powell Co.

Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

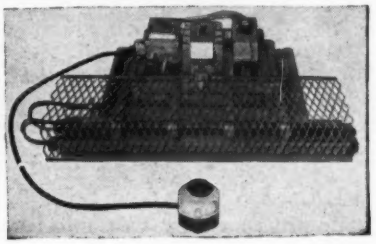
the Flomixer's efficiency is due to the improved design of internal contours and proportions, with resultant reduction of pressure losses within the unit. Air requirements are accordingly lessened to produce a given mixture pressure, and smaller blowers can be used, or increased burner capacities realized, with the new unit. An air supply of one pound pressure will produce a mixture pressure of 13" water column with natural gas, 11½" with manufactured gas.

Accurate gas-air proportions are maintained at all rates of flow, as long as zero pressure gas is supplied.

The gas ratio adjuster is a universal type, suitable for any type of gas. Gas from 550-3200 BTU can be handled and no change of equipment is required in case of change-over. The device is easily adjusted, and may be sealed at any particular setting if desired.

Heat Sealer QC 823

Pack-Rite Machines announce the development of their new solenoid-operated "30-inch Giant-Jaw" Heat Sealer.



Equipped with 30-inch hard chrome-plated sealing bars with either horizontal-krimped or flat seal bars, the Giant-Jaw will heat seal unusually large bags, pouches, sheets, etc., by merely pressing the foot switch which actuates the solenoid, eliminating foot pedals and allowing freedom of both hands for feeding the material into the sealer.

The dial thermostat controls the temperature in the stainless steel-sheathed heating elements, providing a heat range from room temperature to 550° F.

To cope with wide bags, pouches, etc., while passing the Giant-Jaw, a simple forward-backward adjustment of the entire machine is provided.

The Giant-Jaw may be mounted horizontally on a work bench or table—or may be operated vertically, when installed on the side of bench.

Slide Rule QC 824

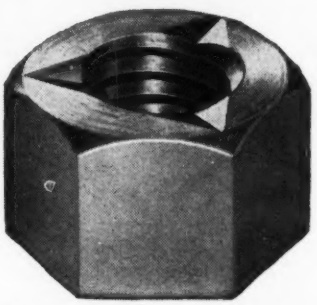
To fill the need for a slide rule of greater dimensional stability, the Charles Bruning Co. has recently introduced a new 10-inch slide rule.

This new slide rule is made of a plastic material that is said to have remarkable dimensional stability and which is not affected by temperature change. The glass indicator is mounted in a polished stainless steel frame that holds it firmly in place.

The graduations are precise and will not lose visibility through use. The CI scale shows numerals and gradations in red to provide ease of reading. To permit the widest possible range of service, A, B, CI, C, D, K, S, L and T scales are shown on the rule. The beveled edges of the rule are graduated in inches and centimeters.

Lock Nut QC 825

The new Gripco lock nut is a semi-finished, one-piece, self-locking nut of



standard dimensions. It requires no lock washers or cotter pins, and a wrench is all that is needed to apply or remove it. The patented, simple, triangular deflections on top of the nut provide a controlled friction lock. The nut is free-spinning until the bolt threads contact the deflected threads near the top of the nut. It is manufactured by the Grip Nut Co.

Viscosimeter QC 826

A new kind of continuous Viscosimeter is announced by the Fischer & Porter Co. The instrument is so constructed as to permit instantaneous observation of viscosity values existing in a moving fluid

Micromax Recorder's big dial facilitates Hercules operator's check on acid-plant temperatures.

Here's How Hercules
Uses a Micromax Pyrometer
in Burning Ammonia

The nitric-acid-making process used by Hercules Powder Co. includes burning of ammonia, with platinum as a catalyst. Temperature must be held high enough to secure efficient yield; yet low enough to avoid damage to the catalyst. The two extremes are critically close.

In order to hold this temperature band, accurate recording is provided by Micromax Pyrometers. Three features especially qualify them:

1. Micromax Recorders consistently maintain their accuracy and sensitivity, so that operators trust them.

2. The dials are easy to read, so that operators look at them often.

3. Their ink-drawn records show how skillfully temperature is being handled.

Practically any industrial recording or control problem can be solved with Micromax Pyrometers. We will be glad to send catalogs, or to make specific recommendation for any specific problems you may have.

LEEDS & NORTHRUP COMPANY, 4982 STENTON AVE., PHILA., PA.

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MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT TREATING FURNACES

Jrl Ad N-33-700(1a)

CARGO – SERVED UP AIR LINE STYLE!

To TWA—long one of the world's leading air lines—a single minute can mean five miles travelled in the air, or five miles lost on the ground. More than a year ago, Trans World Airline set out to shorten cargo handling time at terminals to keep pace with faster flight schedules made possible by improved aircraft.

After making a thorough study of its existing handling methods and investigating the methods and equipment used by other air lines, as well as by the Army and Navy during the war, TWA selected Towmotor Lift Trucks and Industrial Tractors, basing its choice on Towmotor's performance in handling all types of air cargo.

An unusual application of the lift truck system was worked out by TWA, whereby special 4-wheeled cargo trailers are moved in trains to plane side by Towmotor Tractors, at which point a Towmotor Lift Truck raises each trailer to plane loading level. This arrangement not only speeds up loading and unloading, but the trailer itself provides extra working space for cargo handlers, simplifying movement of cargo in and out of the plane and expediting balanced loading, particularly important in air transport.

The use of 4-wheeled trailers with Towmotor Tractors also enables TWA to collect various types of cargo, such as baggage, air mail and air express, at separate points in the terminal and move it rapidly and safely to plane side for loading. Similarly, unloaded cargo is distributed quickly and carefully to various locations at the airport.

For every handling problem there is an engineered solution . . . a solution based upon Towmotor experience and know-how gained in solving handling problems in every industry. Send for your copy of the Towmotor Lift Truck ANALYSIS GUIDE today. Towmotor Corporation, 1237 East 152nd Street, Cleveland 10, Ohio.

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TOWMOTOR

THE ONE-MAN-GANG

CHIKSAN FORMULA

FOR PERFECT FLEXIBILITY

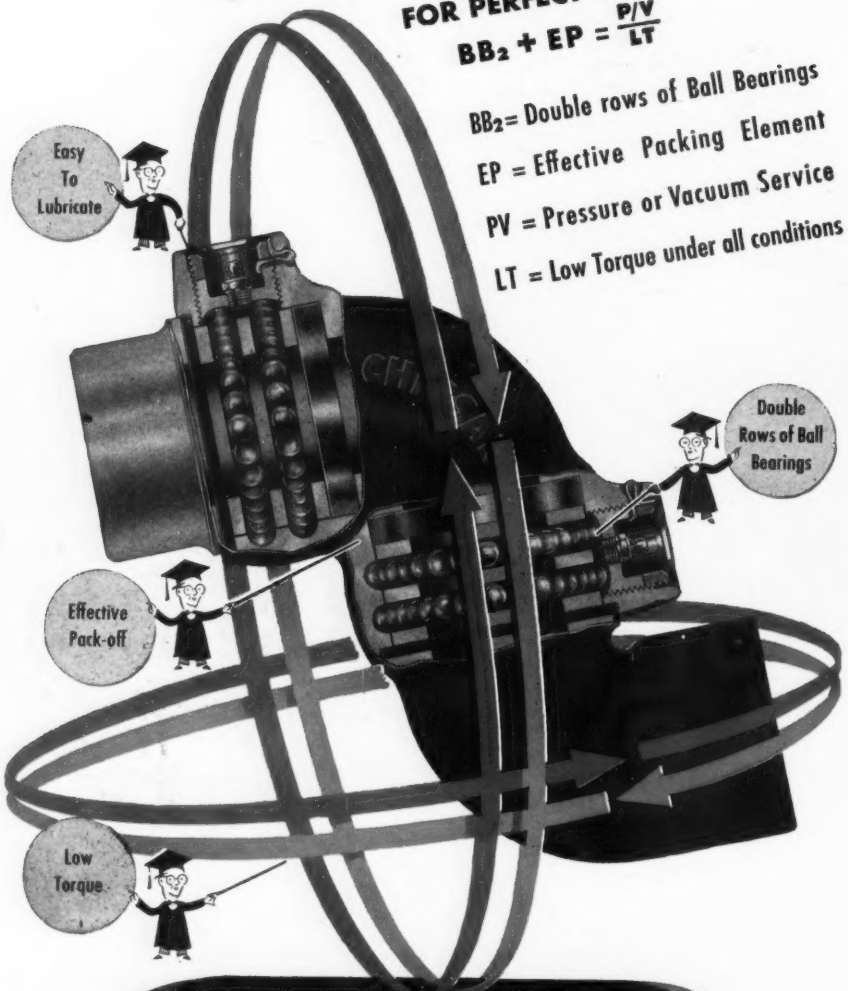
$BB_2 + EP = \frac{P/V}{LT}$

BB_2 = Double rows of Ball Bearings

EP = Effective Packing Element

PV = Pressure or Vacuum Service

LT = Low Torque under all conditions



The CHIKSAN FORMULA MAY BE THE ANSWER TO your PROBLEM!

Chiksan flexibility is so precisely engineered that the elements which provide for easy turning and perfect seal under pressure or vacuum can be stated in a few simple symbols. This streamlined design, expressed in precision manufacture, has won world-wide acceptance for Chiksan Ball-Bearing Swivel Joints wherever movement or rotation is required in pipe lines handling liquids, vapors and gases... in aircraft... electronics ...railroads...chemical and food processing plants...refineries ...marine installations...open hearth furnaces and rolling mills...and hundreds of other applications. The new Chiksan Catalog illustrates and describes over 500 different Types, Styles and Sizes. Your Engineering Department should have a copy for ready reference.

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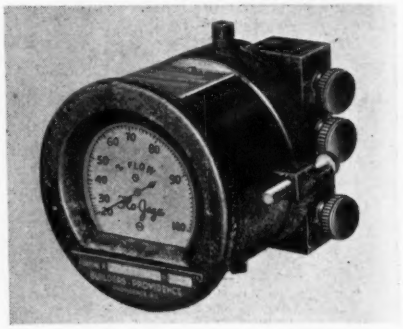
CHIKSAN COMPANY BREA, CALIFORNIA

NEW YORK HOUSTON

stream under full line pressure. This Viscosimeter is available in simple indicating form, or arranged for continuously recording viscosity values on a 24 hour chart or for controlling fluid viscosity by automatic blending or heating means. The instrument is said to be particularly valuable for continuously blending lube oils, indicating the end points in various plastic processes and in the maintenance of constant fuel oil viscosity for improved oil burner operation.

Flow Meter QC 827

Flo-Gage—a simple, inexpensive flow indicator, has just been announced by Builders-Providence, Inc. (Division of Builders Iron Foundry). This midget differential meter indicates rate of flow of liquids and gases through lines containing orifices, venturi tubes and insert nozzles as differential producers and also indicates liquid level and pressure differences.



Features of the new Builders Flo-Gage are its simplicity, accuracy, legibility, sensitivity and low cost. It requires very little space, is easy to install, and requires no mercury or auxiliary power. The gauge has no stuffing box and can be furnished to measure such units as gallons per minute, cubic feet per hour, etc., and indicates rate of flow within 2% of full scale. The gauge mechanism is enclosed in a heavy semi-steel chamber having a thick prestressed glass window designed for an operating pressure of 500 p.s.i.

Water Heater QC 828

Designed for steam pressures of from 50 pounds to 150 pounds, the O'Brien All-Bronze Steam-Mixer water heater quietly diffuses steam directly into water to produce approximately 40% more hot water per pound of steam than conventional indirect heaters. A new muffler-type diffuser eliminates the excessive noise that has hertofore accompanied the direct mixing of steam and cold water.

The O'Brien instantaneous heater is complete with automatic temperature-pressure controls, safety relief valve and easy-reading thermometer. Capacities range from 600 to 5500 gallons per hour for 100° temperature rise. Standard temperature ranges are 100-140° F., 120-160° F., 140-180° F., and 160-200° F. Intermediate ranges between 100° F. and 200°

F. and special ranges below 100° or above 200° with adjustment of 20° plus or minus, are available at extra charge.

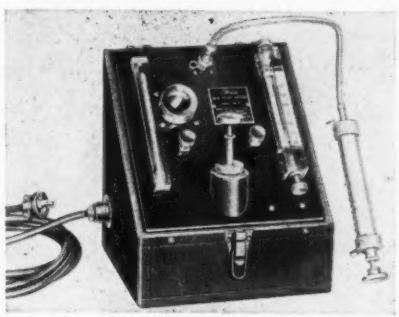
Rotameter QC 829

In chemical plants where corrosive fluids and gases require special piping materials such as Haveg, Karbate, Pyrex, porcelain, hard rubber, etc., metering problems are being capably solved by the new versatile Schutte & Koerting Chemical Rotameter. It is so designed that the metered fluid comes into contact only with the required special material and the pyrex metering tube. The special parts, even when made of these relatively fragile materials, are engineered to withstand the hazards of everyday use and are amply supported against stresses in the piping and thermal shock.

Special corrosion resistant rotors of platinum, silver, Haveg, Karbate, etc., are used in SK Chemical Rotameters. All meter parts are standard and design simplicity assures efficient operation.

Dew Point Indicator QC 830

Illinois Testing Laboratories, Inc., has announced the new Alnor dew point indi-



cator. In operation a sample is drawn into the dew point indicator from the surrounding air and is held in the observation chamber, at a pressure above atmosphere produced by a small hand pump. A pressure ratio gauge indicates relation between pressure of the gas sample and atmospheric pressure. Temperature is indicated by a thermometer. The gas sample is allowed to stand for a moment to stabilize temperature in the observation chamber. Depressing the operating valve produces a visible condensation suspended in the air or gas in the lighted observation chamber. This procedure is repeated to find the end point or vanishing point of the fog of condensation.

The temperature of the dew point of the air or gas sample is read from a chart based upon initial temperature and pressure ratio. Relative humidity, latent heat, and grains moisture per lb., can be obtained from reference charts once the dew point is known.

The Alnor dew point indicator is available in two ranges, for dew points between —20 deg. F and room temperature, and for dew points from —100 deg. F to 0 deg. F.

THE use of Tygon Paint on brick, concrete, or metal not only gives *assured* protection against almost all corrosive fumes, condensates or acid slop-over, but doubles and triples the intervals between paintings.

Here's why: Tygon Paint is a liquid form of Tygon Plastics — the chemically inert material used, in sheet form, to line acid tanks. In its liquid form, Tygon is applied by brush or spray gun (first a coat of Tygon Primer, then two or more Tygon finish coats) to virtually any concrete, wood, brick or metal surface. Tygon Paint air dries quickly (by solvent evaporation) ... forms a tough, durable film of pure Tygon ... a film that (since it's not subject to oxidation) will not chemically deteriorate with age ... stays young longer.

In countless installations in chemical and metal working plants, in breweries, wineries, dairies; in food processing plants, in hospitals, laboratories; virtually everywhere a long-lived, truly protective coating is required, Tygon Paint has proved its superiority.

Write today for a generous free test sample of Tygon Paint — or better yet, order our Trial Offer Kit, consisting of a quart of Tygon Primer, a quart of Tygon Paint (white, black, gray, green, red, aluminum or clear) and a pint of Tygon Thinner — postpaid anywhere in the continental United States — $5.00.

Synthetics & Plastics Division

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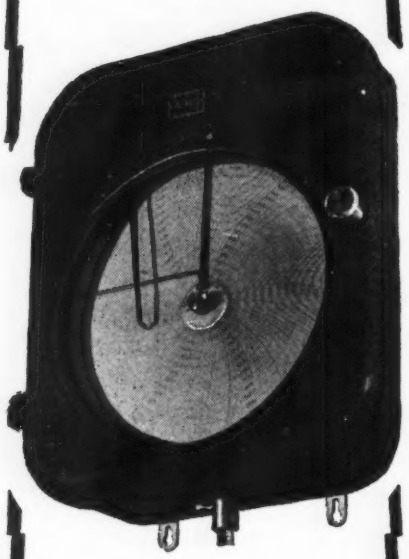
Since 1865 • Akron 9, Ohio

The best protection
is PERFECTION



Indicating, Recording and Controlling Thermometers for every Industrial Application

Illustrated catalog CA46 on request

GOTHAM INSTRUMENT CO.
149 WOOSTER STREET
NEW YORK 12, NEW YORK
Representatives in all Principal Cities

Rotating Water Joint QC 831

The Deublin union, a new type rotating water joint, for cooling revolving shafts, cylinders, or drums, has been announced by the Deublin Co. The union will handle liquids up to 200° F.

The Deublin union utilizes a helical groove on the rotor which runs counter to the direction of rotation to provide a sweeping action to prevent leakage between the shaft and housing as well as keeping foreign objects from lodging between the two surfaces. Precision machining leaves maximum clearance between the shaft and housing of .0005". Rotor concentricity is held to .001" total indicator reading.

The rotor is machined of stainless steel while the housing is of bronze. Both rotor and housing resist the corrosive action of water, brine, and other liquids that may be used for cooling or heating.

Standard, sealed, "lubricated-for-life" ball bearing provides almost frictionless freedom of movement. Wobble is eliminated by special tooling of threads which are concentric in relation to bearing surfaces.

The Deublin union is made in two types: Monoflow and Duoflow. Four standard sizes are available in both types, but because of the basic design of the union, any size can be manufactured from ¼" pipe size to 6".

Ball Mill QC 832

The new High-Efficiency ball mill of the H. K. Porter Co. employs new design details which are said to reduce grinding time, save power, and minimize contamination.

Included among improved construction features of the new mill are:

1. *Herringbone Lifter Bars:* The use of herringbone lifter bars increases grinding efficiency by raising the height of the mass of balls, increasing cascade and rolling, producing a more rapid crushing and grinding action.

2. *Automatic Vent Valve:* A spring loaded valve is incorporated in the head of the mill to insure proper and automatic venting.

3. *Forged Steel Trunnions:* A forging provides a homogeneous structure of great strength and high endurance limit at the trunnion by permitting optimum distribution of load without danger of stress concentration.

4. *Herringbone Gearing* provides smoother operation. There is increased strength and reduced vibration under conditions of repeated shock loading since the load is distributed over a greater number of teeth which are transmitting power. Back lash is practically eliminated.

5. *Quick-Opening Charge and Discharge Door:* Quick-fastening, quick-releasing toggle action clamps insure positive lock and provide a simple means for removal of door assembly.

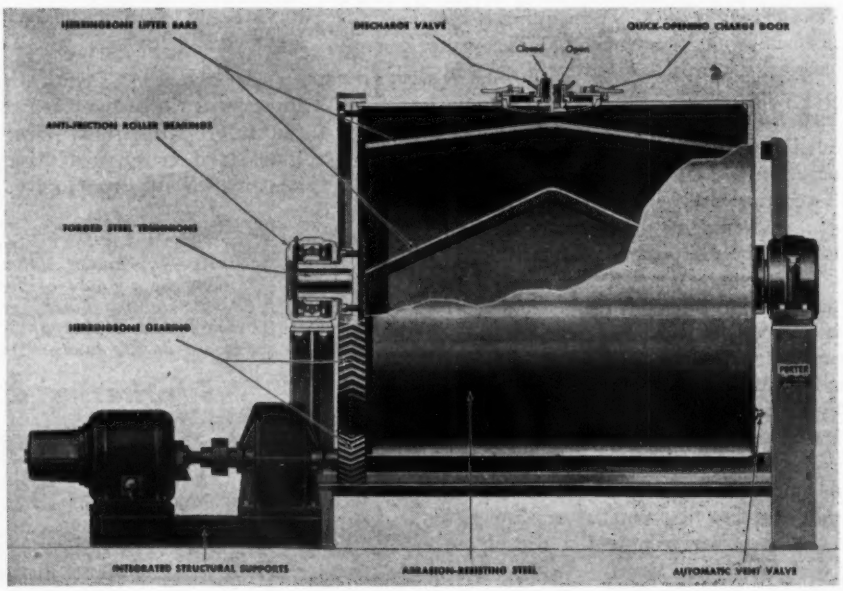
6. *Integral Discharge Valve:* The discharge of mill contents can be rapidly effected without the necessity of time consuming change from a grinding door to a discharge door.

7. *Integrated Structural Supports:* Overall foundation dimensions are kept to a minimum through a unitary design by which both bearing supports and drive assembly support are rigidly tied in with one another. This rigid structure eliminates the possibility of misalignment.

8. *Anti-Friction Roller Bearings:* Power-saving, self-aligning, anti-friction roller bearings contribute longer service life and reduce maintenance costs. The self-alignment provision insures trouble-free operation even under conditions resulting from possible misalignment, deflection and settling of the mill.

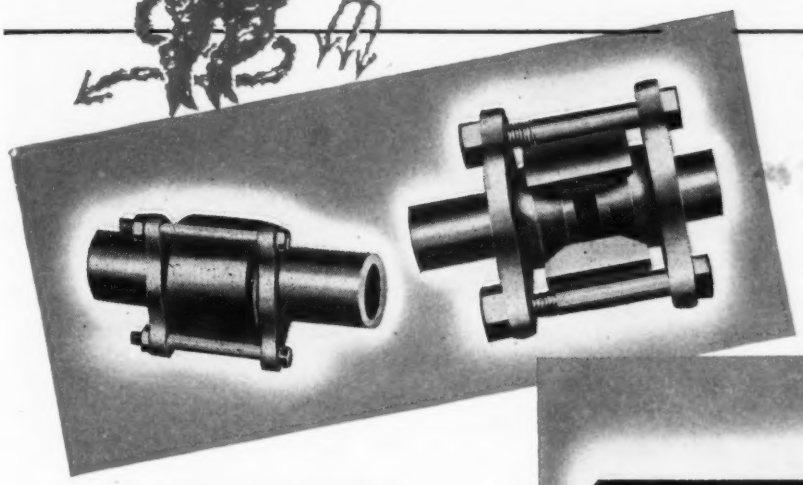
9. *Abrasion Resisting Steel Shell:* Mill shell of abrasion resisting steel gives increased resistance to wear, as well as greater strength, and contributes to longer service without change in structural rigidity.

10. *Flat End Plates:* Overall length of mill is reduced by using flat end plate de-



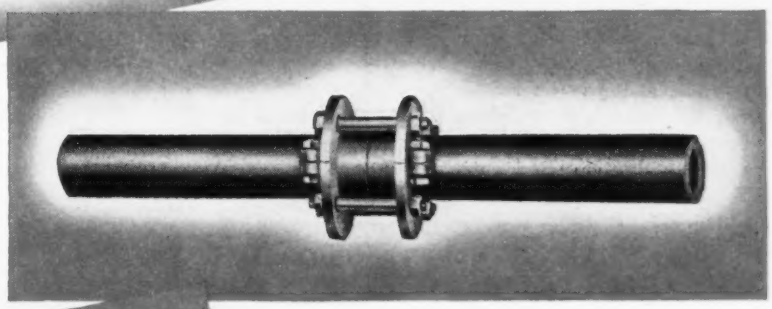
FOUR STRONG NON-CORRODIBLE

KARBATE
BRAND
EQUIPMENT CONNECTIONS



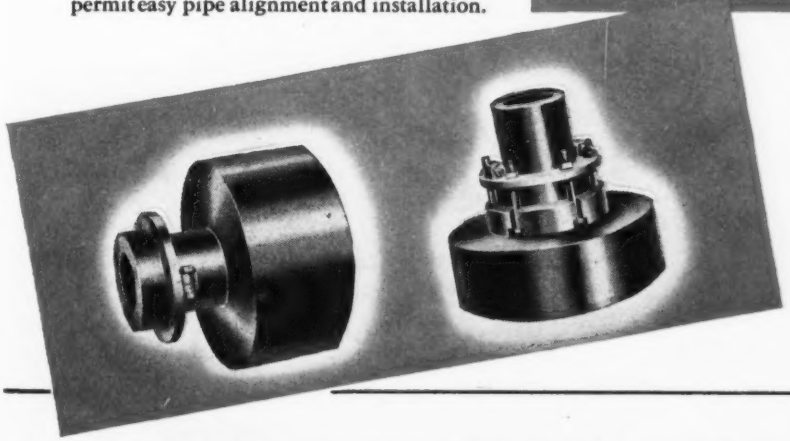
Type FC Flexible Coupling

Permits movement in any direction to protect "Karbate" piping from effects of vibration, misalignment, and differential expansion. Easily installed or dismantled on the job. Simplifies final pipe-length adjustment between pieces of equipment. Used with "Karbate" preassembled standard nipples and fittings, pipe may be cut to length and rapidly installed in the field.



Type V Flanged Connection

Thick, small-diameter collars provide sturdy construction. These can be used with companion flanges of almost any design or material. The separate cast-iron split flanges permit easy pipe alignment and installation.



Type V Nozzle
Type SC Slotted Coupler

Recommended for connections on "Karbate" tanks, towers, heat exchangers, and similar equipment. Generally installed at our factory—not particularly suitable for field installation. The Slotted Coupler is of more compact construction than the Type V Nozzle, but the choice of connection depends upon requirements of each job.

STRENGTH and ease of installation distinguish four improved "Karbate" chemically resistant equipment connections that are doing a first-rate job in many kinds of service.

Like the many "Karbate" specialty products used for **storage, conveying, handling,** and **processing** of corrosive liquids and gases, these connections are not only strong, but have high resistance to mechanical and thermal shock and to the action of most acids (notably hydrofluoric), alkalies, and other corrosive chemicals.

The designs of these connections are the result of years of experience of National Carbon Company, Inc., in furnishing "Karbate" impervious carbon or graphite equipment to the chemical, process, and other industries.

• • •

For additional information about "Karbate" equipment connections, write to our nearest Division Office for Catalog Section M-8805.

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide and Carbon Corporation
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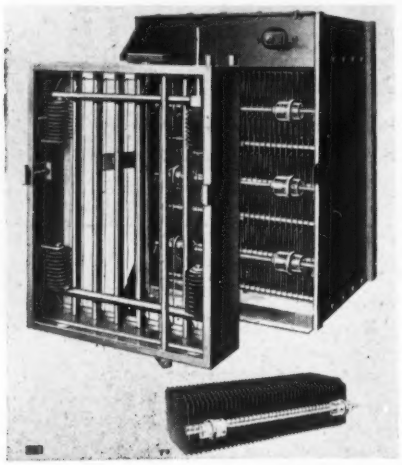
UCC

General Offices: 30 E. 42nd St., New York 17, N. Y.
Division Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

sign which permits compact construction of head with shell. Closer application of trunnion bearings to mill also results.

Air Filter QC 833

The Electro-Cell, a unit type electronic air filter with removable collector plate assemblies, is a new type now being manufactured by the American Air Filter Co., Inc.



The positive and negative collector plates are assembled on cross rods to form horizontal groups which are easy to handle and may be readily removed from the filter casing. Sliding into the filter casing in much the same manner as a desk drawer, plate assemblies can be removed for cleaning and re-oiling at convenient water and sewer connections. By keeping a spare set of plates sufficient for one section for use as a replacement, the length of time the filter is out of service is reduced to a minimum and the dirty collector plate assemblies can be cleaned at a time that is most convenient for maintenance personnel. An automatic washing device has been developed permitting collector plate assemblies to be washed in place for installations where manual washing is not feasible.

Standard sections of the Electro-Cell are 2′ and 3′ in width with a capacity of 1,000 cfm per unit and range from this minimum to as many sections as are needed for the particular installation. The construction of the filter is such that it eliminates the duplication of top and bottom sections of box-like units when assembled one upon another. This is accomplished by the manufacture of the filter in a variation of heights from a minimum of 27″ to a maximum standard height of 15′ by 9″ increments.

Immersion Pyrometer QC 834

The new Pyro immersion pyrometer with interchangeable thermocouples has been announced by the Pyrometer Instrument Co. The design of this instrument includes a 4¾″ indicator with a 4″ direct reading scale calibrated from 0-1500° F. or 0-2500° F. or equivalent centigrade. Two models with an overall length of 27″ and 43″ are manufactured. Both open and protected type thermocouples can be used with this instrument.

Safety Goggle QC 835

A new all-plastic safety goggle has been announced by Watchemoket Optical Co.

The methacrylate lens stops flying chips, splinters, splatters of hot metal. It exceeds Federal specifications for impact-resisting goggles, yet is as clear and free of distortion as the finest optical glass.

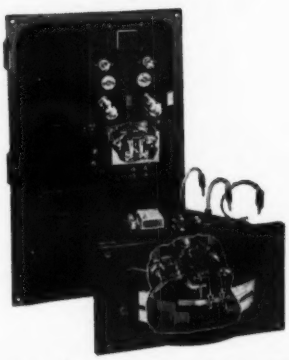
Package Conveyor QC 836

The Coaltoter Conveyor Co. has announced the addition of a new portable endless belt type package conveyor to its line of Tote-All conveyors. According to the manufacturers this new conveyor is especially adapted to the handling of all kinds of packaged material. It has 10″ wide rubber belt with various arrangements and sizes of cleats, and is available in 14 ft. and 20 ft. lengths.

Power is furnished by a gasoline engine which is mounted underneath the center of the conveyor or conveyor may be furnished with an electric motor for use where electricity is available.

Electronic Pyrometer Controller QC 837

The Wheelco Instruments Co. announces the Wheelco Multronic Capacitrol, a multi-position electronic pyrometer controller.



A new development of the Wheelco electronic control principle—the Multronic Capacitrol—adds further flexibility, to

COUNT AND CONTROL FAST!

Potter

DUAL-PREDETERMINED ELECTRONIC COUNTER

A time and money-saving instrument

- For processes requiring a rapidly repeated operation to occur after a predetermined number of counts!
- For counting and stacking sheet metal.
- For accurate control of length and spacing of slide fasteners.
- For use in automatic packaging of objects such as buttons and pills.
- And for many other operations throughout industry.

This instrument uses three to four standard Potter 4-tube counter decade circuits arranged to give two independent predetermining channels in which any number, from 0 to 10,000, may be initially set up. Each channel is alternately pre-set to the desired predetermined number by automatic, self-contained circuits at a speed not obtainable with predetermined mechanical counters. The input is arranged for operation with either make-contacts or sharp negative pulses. Input frequencies may be in excess of 1000 cycles per second. The output includes an ultra-high speed relay with single pole double throw contacts. The standard unit may be ordered for a total count capacity of 1000 to 10,000 with either the single or dual predetermining channels. Other count capacities on special order. Write for additional details.

INSTRUMENT Potter COMPANY

ELECTRONIC COUNTER PRODUCTS

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Hose Racks and Reels Reach Remote Fires

Supplied with hose up to 150 feet in length connecting carbon dioxide cylinders with discharge horn, Kidde Hose Racks and Reels offer a highly effective means of fighting fires over a wide area.

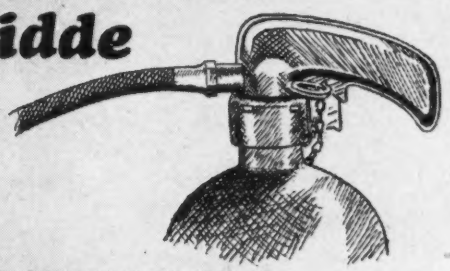
They are particularly useful in fighting flammable liquid or electrical fires too large for hand portables, but not large enough to require a built-in system.

Kidde Hose Racks and Reels can be furnished with one or more 50-pound cylinders of carbon dioxide. In addition to the release valves on the cylinders, a temporary shut-off valve is furnished on the discharge horn. Full details are available from Walter Kidde & Company, Inc.

How to Make Fire KILL ITSELF

See how easily electrical and flammable liquid fires can be extinguished *—completely automatically.* Write for free 12-page bulletin, "How to Make Fire Kill Itself." Walter Kidde & Company, Inc. 545 Main Street, Belleville 9, N. J.

Kidde



THE SIMPLEST WAY TO FIGHT A FIRE!

With a Kidde Hand Portable, you just aim at the fire and pull the trigger. Carbon dioxide capacities from 2 to 20 pounds.

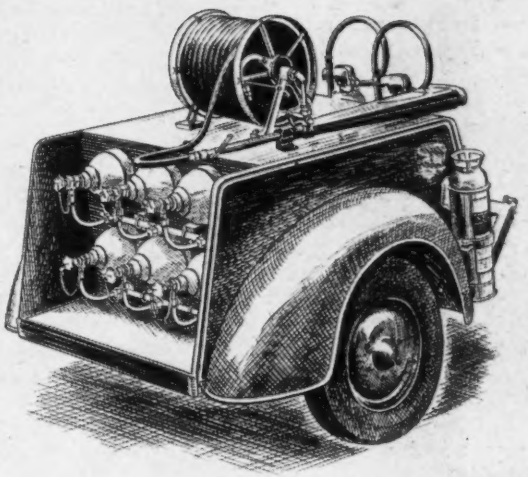
Mail and Phone Orders Filled

Kidde

AIMS STRAIGHT AT HEART OF FIRE

To kill flames fast, Kidde "local application" nozzles—supplied as part of built-in systems—aim the carbon dioxide discharge *straight* at the danger spot.

Kidde



Punch-packing Trailer

FOR INDUSTRIAL FIRE BRIGADES

Here's plenty of fire-fighting wallop in a compact unit that can be maneuvered through factory aisles. Just hook a Kidde Trailer Unit to a light truck—or even a motorcycle—and you're ready to fight fires practically anywhere in the plant!

Built to specification. A typical unit carries a hose reel with 300 pounds of carbon dioxide; two 15-pound carbon dioxide portables; two Kidde water extinguishers. Write for details.

The word "Kidde" and the Kidde seal are K Kidde *trade-marks of Walter Kidde & Company, Inc.*

Walter Kidde & Company, Inc. • 545 Main Street, Belleville 9, New Jersey

Strikers Snub 15-Cent Offer

General output at factories and mines decreased 4 per cent in October, while in the first half of November

Higher Pay Asked

stationed in a little town in France for several months, wooed a French girl by telling her about

meet a multitude of applications. The new Multronic Capacitrol provides 1) Conventional on-off control at one or two different points, or 2) Control of two separate fuel systems on a single pot or other heat-treating type furnace, or 3) Automatic positioning control for electric, oil and gas-fired equipment, or 4) On-off control plus automatic fuel shut-off, or 5) Multi-signalling at two points or two signals at dual points.

Pipe Gage QC 838

The Three-Point Gage Co. has announced a new gage, which is so calibrated that when placed against a piece of pipe or conduit, it immediately registers the exact size by which it is known to the trade and the drill size to tap. It measures any pipe from ⅛ inch to 12 inches and all sizes of electrical conduits and thin wall tubing.

This new gage is pocket size, 2¾" by 4½", constructed of steel and finished in a black rustproof finish with deep etched numerals filled with white enamel.

Leak Detector QC 839

The Westinghouse Electric Corp. has announced a new application of the mass spectrometer; as a leak detector for vacuum systems. To test a vacuum system, the mass spectrometer is attached to it and pumps started to evacuate the air. Then a thin jet of helium gas is sprayed against each suspected location, or over the entire system. If there is no leak, the detector, set to detect the presence of helium, shows no reading, because normally there is no appreciable amount of helium in the atmosphere and hence there are no molecules of the proper mass to actuate the recorder passing through the spectrometer. Should the detector show a reading when the helium nozzle is held at a certain location, the operator knows instantly that helium is entering some opening in the vessel at that point.

Its use in the atomic bomb project marks the helium leak detector as a promising comer in the high-vacuum field.

Side-Entering Agitator QC 840

Although the new side-entering agitator of the H. K. Porter Co. was engineered to meet specific problems in the petroleum refinery industry, the new mixer, called "The Refiner," has advantages of construction which make it particularly adaptable to mixing all materials of extremely low viscosities.

The entire housing of the new agitator is cast in one piece, assuring positive alignment and high resistance to shock and vibration. When it is important to prevent contamination of the batch, any machinable alloy can be specified for the housing. The packing gland of the "Refiner" is equipped with a needle bearing. Packing is located in the front of the bearing housing, and as an added precaution, by-passes are provided for carrying off any incidental leakage.

"The Refiner" is also equipped with a unique device for sealing the liquid in the tank while the stuffing box is repacked. The stuffing box is accessible from the outside so that repacking can be accomplished while the tank is full, without loss of liquid.

Water Treatment QC 841

A packaged unit for boiler water treatment has been announced by %Proportioneers, Inc.%. This new unit includes a %Proportioneers% Adjust-O-Feeder compactly mounted with a motor on the same base with a chemical tank and agitator. It automatically feeds all treating chemicals and compounds. This packaged unit feeds chemicals for the effective control of scale, pitting and corrosion and thereby prolongs the life of boilers.

MODEL MG "BOND"

Semi-Automatic Packer, Gross Weigher, Volume Filler

For all types of powdered and granular material

Packaging powders or granular materials in snug cartons or containers with reduced openings is a real problem to many manufacturers of cosmetics, chemicals, drugs, and foods. The Model MG "Bond" Packer is especially designed to overcome this stumbling block. And, it may be optionally equipped as a gross weigher of exceptional accuracy or a speedy volume filler.

The MG "Bond" is a single station, semi-automatic machine capable of handling packages ranging in size up to 14 inches high with a base up to eight inches square or eight inches in diameter. A single operator can fill 25 containers a minute.

Also manufactured by *US* are many other packaging machines, of from one to four stations, either semi or fully automatic. Do you have a problem in packaging? *US* Automatic can fill in the answer.

Send U.S. details on any of your packaging problems—we have the machines and the engineering background to help solve them.

US Automatic Box Machinery Co. Inc.

Designing and Developing

NATIONAL PACKAGING MACHINERY CO. & CARTONING MACHINERY CO.

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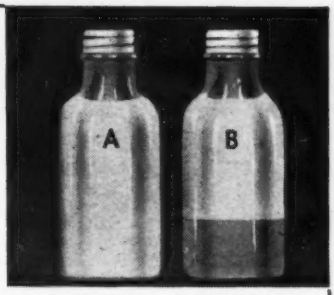
With Hand Homogenizer *Old-fashioned Method*



A—Properly homogenized with Hand Homogenizer. *B—Old-fashioned method; not properly homogenized.*

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Easily operated by merely pumping hand lever. Simple to keep clean—nothing to stick or break. Made of molded aluminum; 10½" high. Stainless steel piston. Available *now* for quantity orders. Only $6.50, direct or from your supply house. *Satisfaction guaranteed.*

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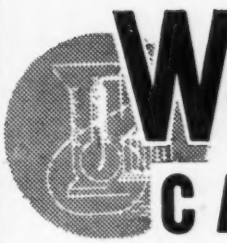

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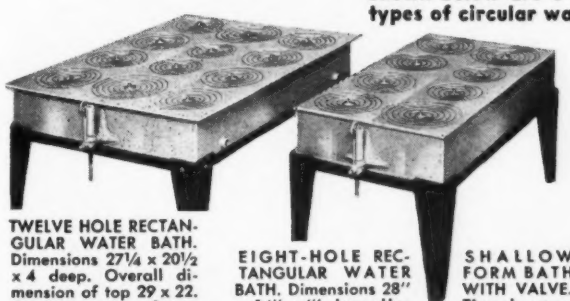
"PRECISION" *Water Baths*

For general utility laboratory use

In addition to a wide range of standard sizes and models of "Precision" constant temperature baths for reduced or elevated temperatures, we specialize in the building of constant temperature equipment for specific purposes. By investigating what Precision has to offer you are certain to get the benefit of more than 20 years of experience.

Shown below are 3 sizes of rectangular water baths and three types of circular water baths for general utility laboratory use.



TWELVE HOLE RECTANGULAR WATER BATH. Dimensions 27¼ x 20½ x 4 deep. Overall dimension of top 29 x 22. Overhanging flange around rim permits flush mounting in table top. Has combination constant level device with overflow and drain.

EIGHT-HOLE RECTANGULAR WATER BATH. Dimensions 28" x 14" x 4" deep. Has overhanging flange for flush mounting in table top. Four hole water bath, same as above shown above at right.

SHALLOW FORM BATH WITH VALVE. Tinned copper, with concentric ring cover with ½ I.P.S. glove valve for controlling steam.

CIRCULAR WATER BATH. Gas Heat. Convenient for restricted space. Equipped with adjustable water level, gauge glass and rubber connections. Brass draw-off cock. Heavy copper, tinned inside. Sprayed aluminum finish.

ARMY MEDICAL SCHOOL MODEL. Cover has 18⅞" diameter openings and tubulature in the center. Perforations in the false bottom correspond with openings in the cover for supporting test tubes, yet allows free circulation of water. Heavy copper, tinned inside, outside aluminum sprayed.

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PACKAGING & SHIPPING

by T. PAT CALLAHAN

Packaging of Poisonous Liquids

HAVING previously discussed the packaging of poisonous solids, in this article we shall consider the packaging of ICC Class B poisonous liquids. These are regulated by the Interstate Commerce Commission, and are defined as follows:

T. Pat Callahan

"Poisonous liquids (including pastes and semi-solids) are substances of such nature that they are chiefly dangerous by external contact with the body or by their being taken internally as in contaminated food or feeds.

"The vapors of some of this class of materials are also offensive or dangerous, but to a much less extent than Class A poisons."

While we will not go into a discussion of Class A poisons in this article the definition for a Class A poison is as follows:

"Poisonous gases or liquids of such nature that a very small amount of the gas, or vapor of the liquid, mixed with air is dangerous to life."

The Interstate Commerce Commission specifically designates the following articles as coming within the classification of Class B poisonous liquids. These and all other liquids possessing characteristics which place them under the definition of a Class B poisonous liquid must be packed, labeled, and shipped in conformance with the Interstate Commerce Commission regulations. The following list of Class B poisonous liquids appears in the Interstate Commerce Commission regulations:

Alcohol, Allyl
Aniline oil
Arsenic acid
Arsenic chloride (Arsenous)
Arsenic trichloride
Arsenical compounds or mixtures, n.o.s.
Arsenical dip (sheep dip)
Arsenous and mercuric iodide solution
Bordeaux arsenites
Carbolic acid (Phenol)
Chemical ammunition (Containing Class B poisons, liquids or gases)
Cyanide of potassium
Cyanide of sodium
Dinitrobenzol
Drugs, chemical, medicines or cosmetics, n.o.s.
Hydrocyanic acid solutions
Insecticide
Ethyl bromide (Bromomethane)
Motor fuel antiknock compound
Nicotine
Nicotine sulfate
Nitrobenzol (Oil of Mirbane)
Nitrochlorbenzene, ortho
Phenyldichlorarsine
Poisonous liquids n.o.s.
Sodium arsenite (solution)
Tetraethyl lead
Xylidene

Poisonous liquids as defined in sec. 336, other than those for which special requirements are prescribed, must be packed in specification containers as follows (we quote):

Spec. 5, 5A, or 5B—Metal barrels or drums.

Spec. 17C or 17E—Metal drums (single-trip containers).

Spec. 37D—Metal drums, single-trip containers, with welded side seams, not over 5 gallons capacity; 10 gallons capacity authorized when without removable head or other opening except a bung hole not over 2.3" in diameter.

Spec. 37E—Metal drums, single-trip containers, with welded side seams, not over 5 gallons; authorized for pastes only.

Spec. 10A, 10B, or 10C—Wooden barrels or kegs.

Spec. 11A or 11B—Wooden barrels or kegs with glass or earthenware inside containers, not over 1 gallon capacity each, or with metal inside containers not over 2 gallons capacity each.

Spec. 12B—Fiberboard boxes with glass or earthenware inside containers not over 1 quart capacity each, or with metal inside containers not over 1 gallon capacity each. Packages containing glass or earthenware containers must not weigh over 65 pounds gross.

Spec. 12D—Fiberboard boxes with inside containers which must be glass or earthenware not over one gallon each; authorized for not more than 75 pounds gross weight; not to contain more than 4 such inside containers if their capacity is greater than 5 pints each. Use of this container will be permitted because of the present emergency and until further order of the Commission.

Spec. 15A, 15B, 15C, 16A, or 19A—Wooden boxes with glass or earthenware inside containers not over 1 gallon capacity each, except that inside containers up to 3 gallons are authorized when only one is packed in each outside container; or with metal inside containers, not over 10 gallons capacity each.

Spec. 103 or 103A—Tank cars.

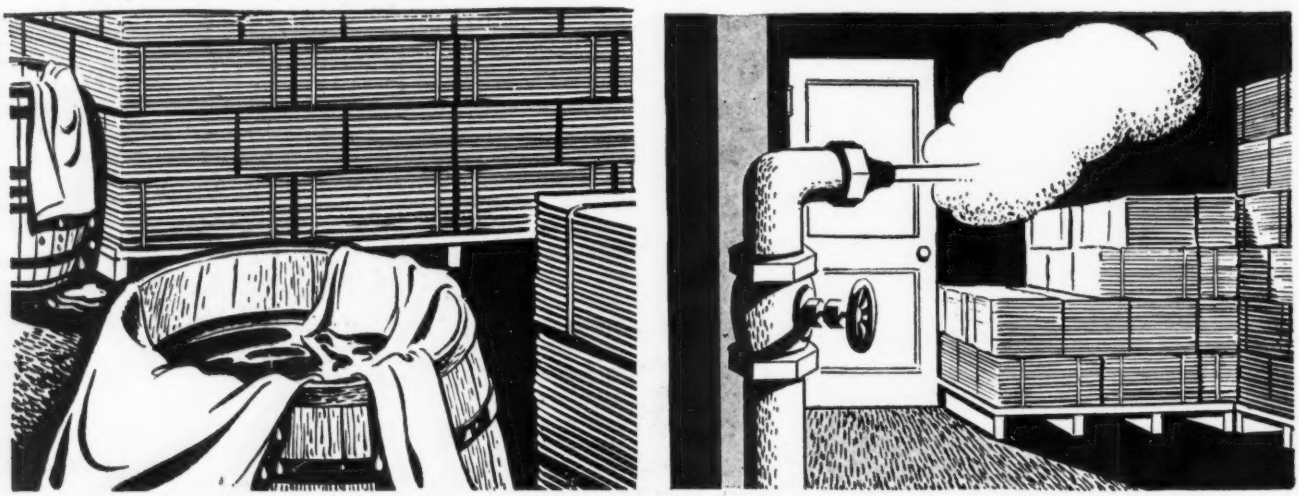
Cylinders as prescribed for any compressed gas, except acetylene, are also authorized.

Spec. MC 300, MC 301, MC 302, or MC 303, tank motor vehicles.

Spec. 1A—Boxed glass carboys, with capacity not over 5 gallons. Must be closed, and when reused must be reconditioned and tested, as provided in the specification. Use of this container will be permitted because of the present emergency and until further order of the Commission.

The reference to "other than those for which special requirements are prescribed" specifically defines the packaging required for the following products which are classified as Class B poisonous liquids.

When any of the below are to be packed and shipped, specific reference must be made to the Interstate Commerce



Paper bag storage rooms should be humidified. Evaporating water or releasing steam will accomplish this.

Buyer making "Peace Plans" for a better steel container

WHEN peace plans call for steel containers, keep the Continental Triple-C trademark in mind. The Triple-C means best in quality and service. Continental steel containers are rugged, economical . . . come in numerous sizes and types for scores of varying uses. Be sure to include Continental steel containers in *your* peace plans.

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Commission regulations. In some cases the specification packing for poisonous liquids in general does not apply when these products are packaged, and in other cases additional containers other than those designated in the general list are prescribed:

Aniline oil
Arsenic acid
Carbolic acid (Phenol)
Hydrocyanic acid solutions
Liquid sodium or potassium cyanide
Methyl bromide
Motor fuel antiknock compound and tetraethyl lead
Phenyldichlorarsine

Particular attention in shipping of poisonous liquids Class B should be paid to the exemptions permitted by the Interstate Commerce Commission. We quote such exemptions in packing and shipping:

"Poisonous liquids, Class B, as defined in sec. 336, except hydrocyanic acid solutions, methyl bromide, motor fuel antiknock compound, phenyldichlorarsine and tetraethyl lead, in tightly closed inside containers, securely cushioned when necessary to prevent breakage and packed as follows, are exempt from specification packaging, marking, and labeling requirements for transportation by rail freight, rail express, or highway, but when for transportation by carrier by water are exempt from specification packaging, marking other than name of contents, and labeling requirements:

"In glass or earthenware containers not over 1 quart capacity each, or in metal containers not over 1 gallon capacity each, packed in strong outside wooden boxes or barrels.

"In glass or earthenware containers not over 1 pint capacity each, or in metal containers not over 1 quart capacity each, packed in strong outside fiberboard boxes."

All Class B poisonous liquids except those which are exempted from the regulations must carry the Interstate Commerce Commission poison label as stated in our previous article, Class B Poisonous Solids. If the poison is not exempt, an official poison label must appear on each outside package. It is not necessary that each package be separately labeled if the shipment is to move in carload lots direct to the ultimate consumer; but to preclude any chance that the container be shipped without the required warning, it is recommended that each unit be labeled.

Particular care should be exercised in the selection of packages for Class B poisonous liquids. It is not to be presumed that any handler of this form of material will encounter much difficulty from any oral intake of the product, except that a leaky container might allow the handler's hands to come into contact with the product and be transferred to his mouth unknowingly. The chief hazard, however, in handling of poisonous liquids is their effect upon the skin of an individual. Particular precaution must be exercised at all times to see that safe containers are prescribed in order that the hazards connected with the handling of poisonous liquids may be eliminated.

Multiwall Bag Care

The use of multiwall paper bags for chemicals has increased by leaps and bounds during the past few years. In fact, the general usage of multiwalls has grown from 251 million bags in 1934 to 1,256 million in 1945. This type of bag was formerly used mostly by cement and lime companies, but now its use for other commodities is twice as great as for cement. Of the total quantity used in 1934, 67 per cent, or 167 million, were used for cement, lime and limestone, and plaster; while the remaining 33 per cent, 84 million, were for all other commodities. In 1945, 35 per cent, or 439 million, were used for cement, etc., while 65 per cent, or 817 million, went for all other commodities.

In several previous articles appearing in this column, mention was made of the savings afforded through the use of multiwall paper bags. Their advantages as one-trip containers were stressed as were the

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"Could I help it if they gave me quick service?"

We yield to no one in our respect for the men in white . . . for the swiftness with which they answer calls of distress. But we're right speedy, too, when our customers yell for help. In order to deliver quick repair service, Crown has fast stepping, capable mechanics located strategically throughout the land. For, naturally, when a battery of closing machines, say, acts up ornery, the boss man wants the quick fix, but good. As a Crown customer he gets it. It's one of the many advantages of using Crown cans.

CROWN

FINE METAL CONTAINERS

CROWN CAN COMPANY • PHILADELPHIA • Division Crown Cork & Seal Company, Inc. • Baltimore, Maryland

other features of easy stacking, less storage space, and reduced freight charges.

Paper performs at its highest strength when it contains the proper amount of moisture. It is actually made with about 6 per cent moisture and should be kept in that condition to perform at its peak.

The companies which make paper bags keep the air in the factory moist by means of humidifiers so that they can ship bags with paper in ideal condition. However, the bags often lose their necessary moisture in transit because of air rushing through car doors. Such bags, if used as received, are likely to show higher breakage than if they are allowed to stand for several days to a week to permit the moisture to equalize. If paper does not contain the proper amount of moisture, it becomes brittle and will tear or break when submitted to pressure. Many times an investigation of paper bag breakage has divulged the fact that moisture had evaporated from the paper for one of two reasons:

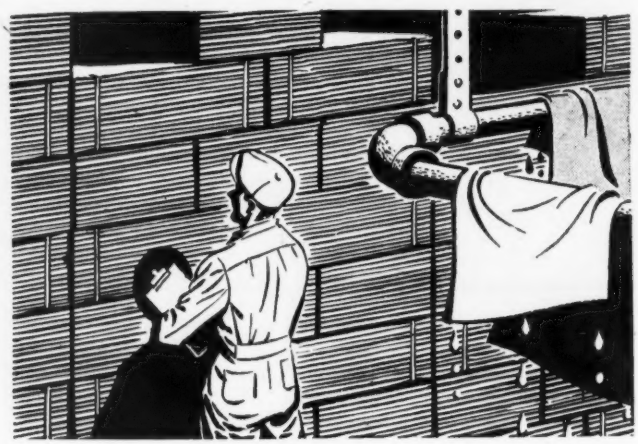
1. Bags were used immediately upon arrival and not given a chance to regain the moisture lost in transit.
2. Storage room of bags did not contain sufficient humidity to retain the moisture in the paper.

Not enough attention is given by some users of paper bags to storage facilities, and if their bag room is dry, something must be done to introduce moisture and keep the strength in their bags. This can be accomplished by the following methods:

1. Introducing steam into the room.
2. Spraying water on walls and floor.
3. Hanging up wet cloths.
4. Opening room to atmosphere on rainy days.
5. Installing humidifying apparatus.

Cold dry storage is bad for paper bags. Normal room temperatures, plus high humidity are ideal.

A very enlightening book, "Important Facts for the Man in Charge of Paper Bag Storage," has been published by Bemis Bro. Bag Company on this subject, and it is available free upon request.



Water on the floor or pinholes in water pipes covered by rags will keep paper bag storage rooms humidified.

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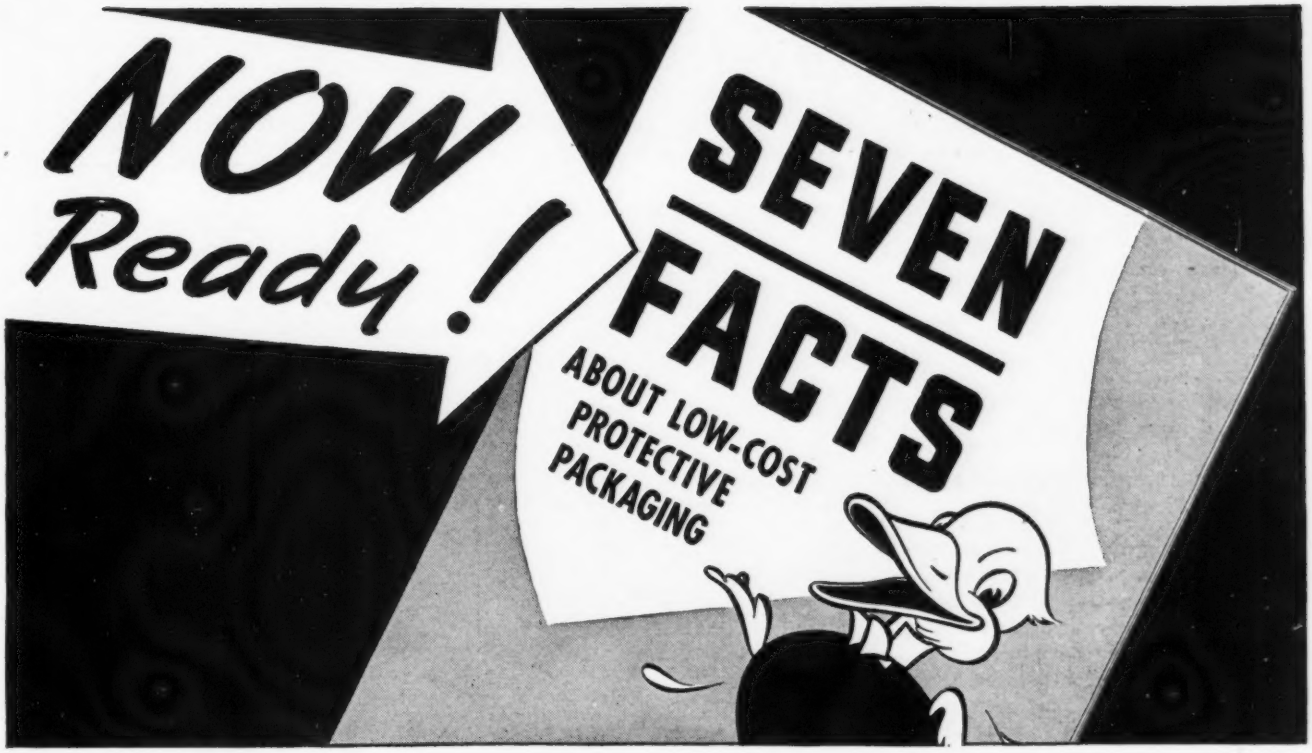

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PLANT OPERATIONS NOTEBOOK

Automatic Control Terms

Automatic control terms, as set forth by the American Society of Mechanical Engineers, will be published in this and ensuing issues. This list has been compiled by Donald P. Eckman of the Brown Instrument Co. division of Minneapolis-Honeywell Regulator Co. and a member of the A.S.M.E. Terminology Committee of the Industrial Instruments and Regulators Division.—Editor.

Automatic controllers are here considered to be only those devices which are constructed and capable of being used in such a way that the complete installation, including the process under control, constitutes a closed loop of action and counteraction operating without human aid.

A phenomenon of the process, called the controlled variable, produces an initial effect upon the measuring means of the controller. If this effect does not correspond with the value of the controlled variable which the automatic controller operates to maintain, the measuring means institutes corrective action. The corrective action restores, or tends to restore, the value of the controlled variable to the desired value.

Unless this whole loop of initial action and corrective action is present, automatic control is not realized. Anything less than this constitutes some form of automatic operation, rather than automatic control.

100 *Automatic Controllers and Control Systems*

101 An *Automatic Controller* is a mechanism which measures the value of

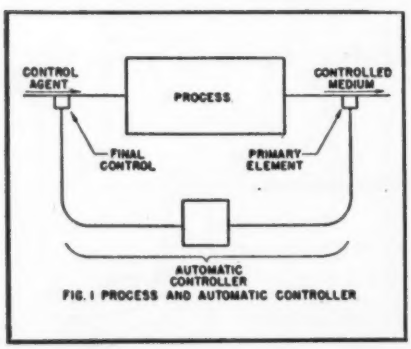

FIG. 1 PROCESS AND AUTOMATIC CONTROLLER

a variable quantity or condition and operates to correct or limit deviation of this measured value from a selected reference. It includes both the measuring means and the controlling means. (Automatic Regulator is synonymous.) (See Fig. 1.)

102 A *Self-Operated Controller* is one in which all the energy necessary to operate the final control element is derived from the controlled medium through the primary element.

This type of automatic controller must have both self-operated measuring means and self-operated controlling means. (See Fig. 2.)

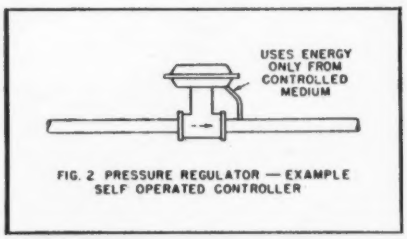

FIG. 2 PRESSURE REGULATOR — EXAMPLE SELF OPERATED CONTROLLER

103 A *Relay-Operated Controller* is one in which the energy transmitted through the primary element is either supplemented or amplified for operating the final control element by employing energy from another source.

This type of automatic controller may have either a self-operated measuring means and a relay-operated controlling means, or a relay-operated measuring means and a self-operated controlling means or a relay-operated measuring means and a relay-operated controlling means. (See Fig. 3.)

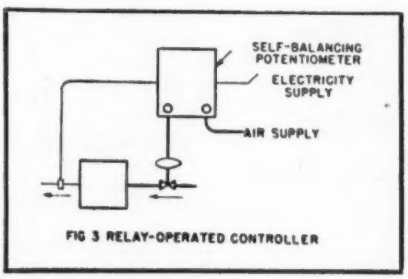

FIG 3 RELAY-OPERATED CONTROLLER

104 The *Desired Value* is the value of the controlled variable which it is desired to maintain. (See Figs. 4 and 5.)

105 The *Set Point* is the position to which the control point setting mechanism is set.

Where the automatic controller possesses a set point scale, the set point is the scale reading translated into units of the controlled variable. Where a setting scale is not provided, the set point is the position of the control point setting mechanism translated into units of the controlled variable.

In some types of automatic controllers, for example, those with two-position differential gap floating with neutral, or proportional-position action, the set point is related to the position of a range of values of the controlled variable. The set point

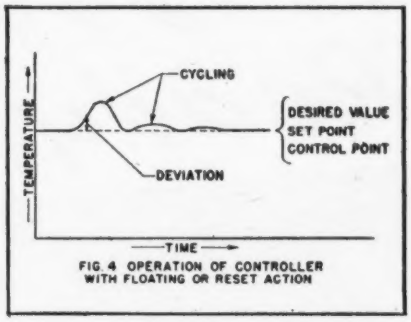

FIG. 4 OPERATION OF CONTROLLER WITH FLOATING OR RESET ACTION

is then generally selected as the center of this range of values.

The set point may be varied manually or by automatic means, such as in time schedule or ratio control. (See Figs. 4, 5 and 12.)

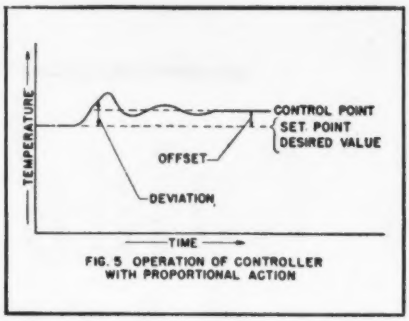

FIG. 5 OPERATION OF CONTROLLER WITH PROPORTIONAL ACTION

106 The *Control Point* is the value of the controlled variable which, at any instant, the automatic controller operates to maintain.

In some types of automatic controllers, for example, those with two-position differential gap or floating with neutral controller action, the control point becomes a control range of values of the controlled variable rather than a single value.

In positioning type controller action, the control point may lie anywhere within a predetermined range of values of the controlled variable. The control point may then differ from the set point by the amount of offset.

In floating with zero neutral zone controller action, the control point and the set point coincide. (See Figs. 4, 5 and 12.)

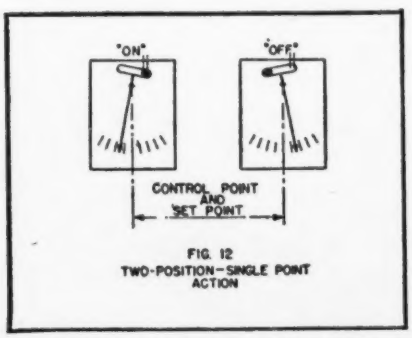

FIG. 12 TWO-POSITION—SINGLE POINT ACTION

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Vitamin Recovery and Separation

This is one of a series of advertisements which indicate the wide range of potential uses for Amberlite ion exchange resins.

The purification, isolation, and concentration of many pharmaceuticals by conventional methods frequently involve highly specialized and laborious techniques. Often, these procedures can be greatly simplified by means of the Amberlites.

One such interesting application which has shown promise in laboratory studies is the separation and recovery of vitamin B_1 from rice bran extracts.* In this mixture, the basic vitamin B_1, in low concentrations, can be adsorbed completely on Amberlite IR-100-H, allowing the less basic vitamin B_2, together with impurities, to pass through in the effluent. The stability of this exchanger permits subsequent recovery of the vitamin B_1 from the resin by treatment with strong acid.

Thus, the Amberlites open up a host of potential applications for the concentration and recovery of valuable materials present in only minute concentrations. By means of the Amberlites, biologically active compounds which contain acidic or basic groups can be separated from objectionable constituents in the same solution.

Your own laboratory analyses or production processes may benefit from the use of the Amberlites. We shall be glad to supply you with complete technical information.

* *Reprints of the paper "Synthetic Resin Ion Exchangers in the Separation, Recovery and Concentration of Thiamine" are available upon request.*

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THE RESINOUS PRODUCTS & CHEMICAL COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

LABORATORY NOTEBOOK

Convenient Way of Handling Bromine

Most laboratories are equipped to handle liquid bromine without too much inconvenience and discomfort, but a method revealed in a 1942 German patent (D.R.P. 694,409) promises to alleviate the difficulties attendant upon handling the noxious material.

Bromine forms a solid compound with tetramethylammonium bromide which contains 83% bromine and 17% salt. The compound is formed simply by addition of bromine to the salt, and the bromine is recoverable upon heating. The freezing point of the compound is about 59° C., and on either side of this maximum the freezing point-composition curve falls away to eutectics of lower melting point.

The vapor pressure of bromine over the compound is very much lower than that of liquid bromine itself: Bromine has a vapor pressure of 173, 264, and 392 mm. respectively at 20°, 30°, and 40°; over the compound, however, with a little excess organic salt, the pressures at the same temperatures are 7, 13.8, and 24 mm.

If left exposed to the air, the compound slowly loses bromine and reverts to the eutectic which is liquid above 13°.

A similar compound, having about the same bromine vapor pressure, is formed with bromine and tetramethylammonium chloride. The latter salt is cheaper, but it is less useful in that it is deliquescent.

Methyl-Purple Indicator Gives Sharp End-point

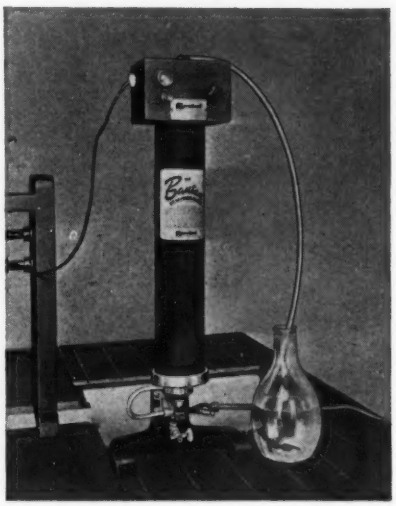
A new indicator, replacing methyl orange in laboratory titrations, is now available from the Fleisher Chemical Co., Benjamin Franklin Station, Washington 4, D. C. Sold in plastic-closure bottles, prices are: pint, $2.50 and quart, $4.50. Sample bottles may be obtained from the manufacturer.

Methyl purple in alkaline solution exhibits an emerald green color, in an acid solution, a purple color. An intermediate steel gray tint provides a convenient warning of the approaching endpoint. The color changes are sharp and distinct. Color transitions take place over a narrow pH differential, and are so sensitive that, when approaching the endpoint of a carbonate titration, a single drop of 0.05N acid effects a transition from the alkaline green to the warning gray, while another drop produces the purple endpoint. The indicator possesses marked accuracy since its endpoint actually coincides with the pH equivalents point for a carbonate neutralization. Its accuracy is unimpaired in the presence of the phosphate ion, a normal constituent of treated boiler water.

All titration factors formerly used for methyl orange or methyl red are said to apply more accurately to the new indicator.

Demineralized Water

To meet the needs of laboratories and industries where the amount of de-ionized water required is not great enough to justify lengthy regeneration processes, the Barnstead Still & Sterilizer Co. has just announced its new Bantam Demineralizer.



It employs a single renewable cartridge which contains both cation and anion resins. No heat, electricity, or chemicals are employed in the process. Flow-rate is from 5 to 15 gallons per hour.

The manufacturer stresses the extreme simplicity of operation and installation. The only electrical connection necessary is for the indicator light which tells when a new cartridge is needed. It plugs into any ordinary outlet and the load is only a fraction of a watt. The Bantam can be connected to the water supply by rubber tubing or ¼" pipe. To use it is then only necessary to turn on the water supply and collect demineralized water in a continuous flow.

It is claimed that one cartridge will remove 400 to 600 grains of ionizable salts. Thus, one cartridge will produce up to 300 gallons of demineralized water, depending upon the raw water hardness.

New Ultrasonics Instrument

A new laboratory instrument which makes available ultrasonic energy for scientific research has been developed by Fisher Scientific Company-Eimer and Amend in cooperation with Crystal Research Laboratories.

About the size of a good-sized radio, the Crystalab Ultra-Sonorator (Trade Name) operates on any 110 volt, 50-60 cycle line and produces over 500 watts of high frequency energy. The larger unit of the two which comprise the new instrument contains the electronic equipment required for generating high frequency power which is delivered by cable to the second unit.

As in modern radio broadcasting, highly accurate ground quartz crystals control the frequency of the oscillations produced. Four frequencies are possible with the instrument—100, 400, 700 and 1000 kilocycles per second. Any other specific frequency in this range may be obtained by the purchase of relatively inexpensive additional crystals. The radio frequency energy is transmitted through the special cable to the smaller unit of the instrument—a glass bath with a matching crystal mounted on the inside bottom. Four such baths are supplied to match the choice of frequencies.

In practice, the bath is filled with a heavy oil and the ultrasonic energy is transmitted from the crystal, through the oil, to the experimental material immersed in the bath.

Chemical applications of this instrument have shown that ordinary water under the effect of ultrasonic vibrations, produces small amounts of H_2O_2. This phenomenon gives rise to many oxidation reactions, such as the instantaneous change of some potassium iodide to free iodine, oxidation of various water soluble dyes and other compounds in solution, and rapid hydrolysis of dimethyl sulphate. Other ultra-sound waves have a reducing action on some compounds. $HgCl_2$, for example, in the presence of ammonium oxalate yields HgCl as a precipitate.

Particles of matter under the influence of ultrasonic vibrations undergo startling physical changes. Some of these are: immiscible liquids, such as oil and water, or water and mercury are transformed into remarkably stable emulsions; long chain molecules have been depolymerized; dispersions in water, alcohol and oil have been made with many of the metallic elements, as well as with fusible alloys.

Various frequencies have been found to cause accumulation and coagulation of precipitates in liquids, suggesting application to the filtration field. Other ultrasonic waves cause smoke or dust particles to agglomerate and makes possible applications in the smoke and dirt prevention field. Some frequencies produce colloidal suspensions of solids in liquids; others break up suspensions, yielding precipitated lumps.

The same versatile ultrasonic waves will diffract a beam of light, cause a wide variety of heating effects, change the electrode potential in an electroplating solution, affect the solidifying time and crystal structure of castings and cause entrained gases in liquids or molten metals to bubble out in a matter of seconds.

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SOLVENTS

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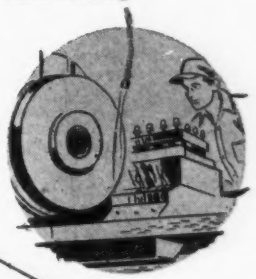
Lacquers formulated with the mild-odored "Cellosolve" solvents have exceptional gloss and film toughness, and do not orange-peel.

LACQUERS

Because "Cellosolve" compounds are good mutual solvents they are used in dry-cleaning soaps and in soluble oils for textile processing and metal-cutting.

SOLUBLE OILS



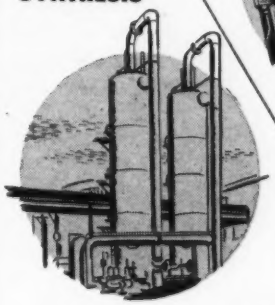
ADHESIVES

Because Methyl "Cellosolve" flows evenly and does not adhere to the machine, it is widely used in the heat-sealing of moisture-proof cellophane.

LEATHER FINISHING

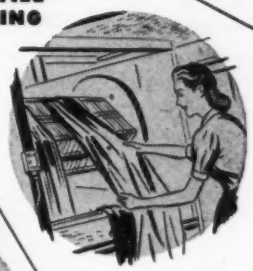
Used with water pigments and dye solutions, "Cellosolve" provides increased penetration, better flow, and an even finish.

CHEMICAL SYNTHESIS



Esters of the "Cellosolve" compounds are finding extensive application as plasticizers for synthetic resins and elastomers.

TEXTILE DYEING



"Cellosolve" solvents increase the solubility of dyes, giving brighter shades.

"Cellosolve" Solvents include: Methyl "Cellosolve," "Cellosolve," Butyl "Cellosolve," Ethylbutyl "Cellosolve," Phenyl "Cellosolve," Benzyl "Cellosolve," Methyl "Cellosolve" Acetate, "Cellosolve" Acetate.

Write for prices and further information on these versatile solvents.

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SYNTHETIC ORGANIC CHEMICALS

The word "Cellosolve" is a registered trade-mark of Carbide and Carbon Chemicals Corporation.

INDUSTRY'S BOOKSHELF

Petroleum Text

PETROLEUM PRODUCTION, VOL. I, MECHANICS OF PRODUCTION, *by Park J. Jones.* Reinhold Publishing Corp., New York, 1946. 228 pp., illustrated. Price, $4.50.

IN THIS BOOK the author divides the production of oil, condensate and natural gas into five functional classifications: mechanics of production; optimum rate of production; reserves and well spacing; condensate and natural gas production; oil production, primary methods and oil production, secondary methods. In this book, Volume I, he deals only with the mechanics of production, bringing together under one cover much recent information along with known principles. The book is addressed primarily to those actually engaged in the problems of petroleum production, showing in detail how the basic theoretical factors apply to practical production conditions. The author has made a conscious effort to express all physical facts in the terms and units used by field personnel, and has supplied ample bibliographies at the end of each chapter.

The subject is treated logically in two main steps: First, the mechanics of production prior to the break through of water or natural gas into wells. Second, the mechanics of production after displacement fluids have broken through. Each of the physical factors is discussed in logical sequence with the use of graphs, equations, tabulated data and calculated examples to demonstrate applications.

From the standpoint of the practical application of theoretical considerations to real problems, the book is unusual. The author recognizes at the cutset that, "The outstanding characteristics of reservoirs is non-uniformity." He carries that theme through the whole text, carefully noting limitations and exceptions to theoretical interpretations.

Food Analysis

ANALYSIS OF FOODS. *Andrew L. Winton and Kate Barber Winton.* John Wiley and Sons Inc., New York 1945; 999 pp. Illustrated. $12.00.

THIS BOOK is one which should be of interest not only to chemists and others working in food analysis but also to biochemists and analytical chemists in general.

Part one is built about established analytical procedures for the determination of food constituents of the listed groups: water, protein, fat, minerals, fiber and ash. The second part of the book is divided into 12 sections concerning special methods, which include, cereal, fatty, vegetable and fruit foods, alcoholic beverages and dairy products.

Valuable as a course textbook, or as a laboratory reference, the volume is well cross-indexed and supplies ample references at the end of every chapter.

History of Perfumes

THE SCIENCE AND ART OF PERFUMERY, *by Edward Sagarin.* McGraw-Hill Book Co., Inc., New York. 268 pp. Illustrated. $3.00.

THE ROMANTIC history of the art of perfumery, and the influence science has had on its evolution into a $50 million U. S. industry, is related in interesting fashion by the author. Well-written, and rich in anecdotes, this book outlines the development of the industry through "40 centuries of fragrance," discussing the history of perfumery, the raw materials of the perfumer, methods of production, and relationship of flavor to odor.

The research accomplishments of Perkin, Baeyer, and Tiemann, in synthesizing coumarin, terpineol, and vanillin, are cited as the origin of perfume and flavoring synthesis. Although all synthetics were slow to be accepted by the trade, today, according to the author, they are indispensable complements to natural oils, and basic to the economics of perfumery.

A useful feature of the book is a well-indexed bibliography of related texts on perfumery, classified under subject divisions, with brief outlines of the character of contents.

Although hardly a reference work, this book does provide a cross sectional view of an entire industry, sketching historical background, explaining its development, and discussing its technical achievements.

Chemical Dictionary

HACKH'S CHEMICAL DICTIONARY, *edited by Julius Grant.* The Blakiston Co., Philadelphia, 1946. 925 pp. Illustrated. $8.50.

THE CURRENT edition of this standard work, containing 57,000 entries, has been completely revised in the light of the newer research findings, and covers with characteristic accuracy, not only the terms used in chemistry, but also the collateral vocabularies of physics, geology, mineralogy, botany, zoology, and medicine.

It provides clear, concise, and reliable definitions of the theories and laws of chemistry, and includes descriptions of elements, compounds, drugs, minerals and raw materials, as well as chemical equipment and instruments. Brief biographical notes on those scientists who have contributed to the progress of chemistry are also indexed.

The revised text has been carefully and competently edited to pre-established high standards. As an encyclopedic dictionary Hackh's may well be regarded as one of the most comprehensive and useful single volumes published.

Organic Syntheses

ORGANIC SYNTHESES, VOL. 25, *edited by W. E. Bachmann.* John Wiley & Sons, Inc., New York, 1945. 120 pp.

TO THOSE who are familiar with the preceding single and collective volumes of this series, the present volume needs no introduction. As before, the work presents tried and tested "recipes" for the laboratory preparation of several important materials and intermediates. Syntheses of the following chemicals are described: acrolein acetal and β-ethoxypropionaldehyde acetal; 2-amino-4-nitrophenol; benzoylacetanilide; *o*-*n*-butoxynitrobenzene; *n*-butylbenzene; 1-*n*-butylpyrrolidine; β-carbomethoxypropionyl chloride; 2-chlorocyclohexanone; α-cyclohexylphenylacetonitrile; diazomethane; 2,5-dimethylmandelic acid; 2,4-dimethylthiazole; dithizone; ethyl benzalmalonate; ethyl (1-ethylpropenyl)-methylcyanoacetate; ethyl (1-ethylpropylidene)-cyanoacetate; *o*-eugenol; furylacrylic acid; β-*d*-glucose-2,3,4,6-tetraacetate; *m*-hydroxybenzaldehyde; isobutyramide; isobutyronitrile; malononitrile; mesitylacetic acid; methyl ω-cyanopelargonate; methyl sebacamate; naphthoresorcinol; 2-nitro-4-methoxyaniline; nitrosobenzene; 4-penten-1-ol; *p*-phenylazobenzoic acid; *p*-phenylazobenzoyl chloride; β-phenylethyldimethylamine; phenylpropargyl aldehyde; sebaconitrile and ω-cyanopelargonic acid. Of special interest, perhaps, is the synthesis from mesityl oxide of the useful reagent, diazomethane.

The book contains a complete subject index of Vols. 20-25.

Other Publications

PUBLIC DOMAIN entitles a new weekly digest of expiring patents published by the Scientific Development Corp., 614 W. 49th St., New York 19, N. Y. Each issue will contain 250 pages, listing over 1000 patents due to expire 4 weeks after date of issue. Each patent shown will include a drawing, where necessary, and a digest of typical claims and salient features. Patents in each issue are indexed alphabetically by subject under 35 categories and sub-categories. Subscription price is $45 per year, $25 for six months, or $10 for ten weeks.

FOOD, DRUG, COSMETIC LAW QUARTERLY is a new publication whose stated purpose is to stimulate and facilitate exchange of professional views in a highly specialized field of law, as well as to reflect unfolding pertinent developments of interest and importance. Each issue presents signed articles by specialists, public officials, and other authorities on the legal problems involved in the industries included in the title. In addition are notes on legislative, administrative, and judicial developments. Published by the Commerce Clearing House, Inc., 214 N. Michigan Ave., Chicago 1, Ill., $10 per year.

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U.S.I. CHEMICAL NEWS

May ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1946

Toughness, Durability Are Features of New Phthalic-Alkyd Resin

Aroplaz 1076 is Recommended For a Variety of Outdoor Finishes

Recently developed by U.S.I., Aroplaz 1076 offers many new possibilities to coatings manufacturers. A pure long oil phthalic-alkyd, it provides toughness and durability, and may be used in all types of exterior finishes.

Similar to Navy 52-R-13 Resin

Except for interior color retentive finishes, Aroplaz 1076 is very similar in physical characteristics and performance to Aroplaz 1240 (Navy 52-R-13 Resin). During the war, this resin helped to protect America's "bridge of

When coatings have to "take it", Aroplaz 1076 provides toughness and durability. Coatings based on this versatile resin are used widely in outdoor applications.

ships" against salt spray, scorching sun, stinging rain, and quick temperature changes. In addition to its resistance to severe service condition, the Navy finish coat based on Aroplaz 1240 possessed good brushability and drying characteristics. Today, Aroplaz 1076 will provide the same superior qualities in a host of tough, durable finishes for many types of civilian work.

Wide Applications

This versatile new U.S.I. resin is recommended for all types of outdoor finishes. It is particularly suitable for trim and trellis, as well as railroad coach and freight car finishes. Aroplaz 1076 may also be used for a wide variety of interior coatings except where extreme color retention is paramount. Samples are available upon request.

The specifications for Aroplaz 1076 are:

Viscosity (GH)	$Z\text{-}Z_2$
Acid No. (plastic)	8-12
Color GH	7-10
Wt./Gal. at 25°C.	7.85-7.95 lbs.
Phthalic anhydride content	25%
Oil content	64%
Rosin content	None

Low-Cost Amino Acid Synthesis Seen Revolutionizing Treatment Of Liver Damage, Burns, Shock

Methionine, Made At Vast Cost Reduction by New U.S.I. Process, Should Play Vital Role in Extending Modern Amino Acid Therapy

With this issue of CHEMICAL NEWS, U.S.I. announces the development of a commercially practical method of synthesizing *dl*-methionine, the amino acid which has been known for some time to have great value in treating and preventing liver damage but which has been little used because of its high cost. The new process is expected to bring a cost reduction in the range of 40 to 1 and to make methionine widely available both for treatment of liver damage and for the still newer uses which also appear to hold far-reaching possibilities. Among these newer uses are the treatment of shock, burns, exposure, as well as poisoning from a wide range of compounds, particularly halogenated carbon compounds. U.S.I.'s methionine is supplied for manufacturing use only.

It is reported that protein hydrolysates containing amino acids have been used with outstanding success in the treatment of peptic ulcers and starvation cases. One of the principal uses of methionine will be to fortify the protein hydrolysate and increase the methionine content. It is known, for example, that yeast hydrolysates, long used for their nutritional value, are deficient in methionine.

Treatment of Burns, Shock and Exposure

Burns, shock, exposure, fracture and surgical wounds are promptly followed by cell destruction on a major scale, owing to the raiding of protein tissue to provide the required methionine. While high protein ingestion might prevent or overcome this destruction, in many cases the patient's ability to consume or retain food is so impaired that a high-

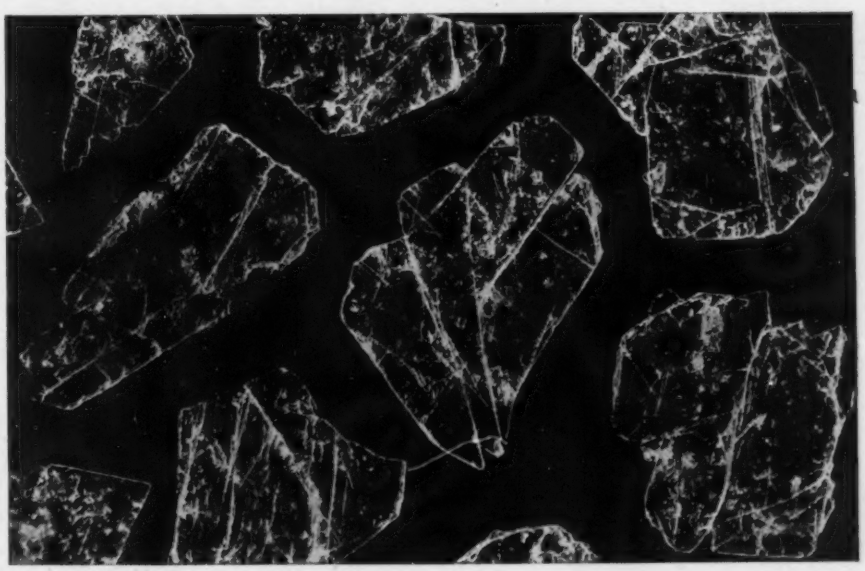
(Continued on next page)

Rotenone Extracted By New British Process

A new process for the extraction of rotenone from derris root is described in a recent British patent. According to the claims made, both the resins and the rotenone are first extracted with acetone. The bulk of the acetone is then removed, and the rotenone and resinous constituents in the residue are separated by dissolving the residue in alcohol. The rotenone is selectively precipitated from the alcohol on standing.

Montan Wax Substitute Made From Lignite, Peat

A suitable substitute for Montan wax—a dark, hard, and odorless ester wax melting at about 80 degrees C.—may now be extracted from Devon lignite and various English and Scottish peats, according to a technical paper published recently. Prior to the war, Montan wax was extracted from the lignites of Saxony and Thuringia. Devon lignite wax is similar to Montan wax in most respects, but peat wax is softer in texture and has a lower melting point by 10-15 degrees C.



The new low-cost methionine helps in many ailments, promises great things in nutrition. These are methionine crystals seen under a microscope.

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May ★ **U.S.I. CHEMICAL NEWS** ★ 1946

Low-Cost Methionine

(Continued from preceding page)

protein diet is impossible. In such cases, as well as those where over-feeding is contra-indicated—such as stomach operations—it is relatively easy to administer the required methionine by capsule or intravenously.

Methionine as a Detoxicant

It appears that methionine not only has definite therapeutic properties, but prophylactic ones as well. Experimental and clinical results show that it exerts a remarkable protective effect on the livers of persons exposed to poisons known to cause liver injury. Among the poisons which yield to methionine are arsenical and phosphorus compounds. TNT, and halogenated carbons such as chloroform and carbon tetrachloride.

TNT Poisoning

TNT poisoning, often fatal, has been effectively treated with methionine, which halts destruction of liver tissue, and aids in its rebuilding. Methionine has also been used with outstanding success in cases of carbon tetrachloride poisoning which would normally prove fatal. There seems every reason to believe that other important applications may be just around the corner.

Action of Methionine

Amino acids are the building blocks of proteins. That is another way of saying that proteins are broken down into various amino acids before they can be assimilated in the body. Of the ten essential amino acids, methionine is the one which seems to be essential to a healthy liver. In addition to poisons which attack the liver, there are other conditions, such as burns, shock, and exposure that cause the animal system to raid tissue-protein molecules for their methionine, causing cell destruction at a rapid rate.

Methionine is primarily an exogenous substance which must be ingested with food, or introduced into the system in some other manner. Best natural sources of methionine are dairy products, fish and liver. However, to administer therapeutic doses from natural methionine sources would call for an impractically large food intake. For instance, 4 to 6 or even up to 10 quarts of milk would be included in the daily diet in order to secure a curative dosage of methionine. A few grams of the new synthetic product will produce the same effect.

U.S.I. is making every effort to have methionine available in sufficient quantities for manufacturing use to supply clinics and experimental laboratories.

THE MONTH IN TEXTILES

A new washable, waterproof fabric suitable for seat covers is developed . . . A nylon slipper is marketed which can be scrubbed with soap and water . . . A method is reported for making rayon shrinkproof . . . High-speed warp knitting is reported from Germany . . . Electrically heated rugs are prepared . . . A new type of polymerizable dyestuff is reported to be superior to old-type dyestuffs . . . A carbon impregnated "conductor" tape is stated to be useful in shielding and electrostatic flux grading . . . A new process is developed for imparting a permanent water-repellent finish to cloth without affecting the "feel" . . . Fire-resistance is imparted to textiles by a zinc borate and phosphate combination . . . By means of a new treatment, it is claimed that all-wool suits can be made cool in warm weather . . . A new mechanical cotton picker is invented.

Atebrin Holds Promise In Treatment of Cholera

Research recently carried out in India indicates that atebrin, now used widely in the treatment of malaria, may also be of value in combating the equally dread disease, cholera. This drug, which is synthesized with the aid of noval ketone, a product of U.S.I., is claimed to have shown promising results with more than a dozen cholera patients.

In dilutions of 1 to 4000, atebrin was found to be bacteriostatic to 10 strains of the Inaba Sub-type of vibrio cholera and 11 strains of the Ogawa sub-type. Its effect, however, was nil on 9 strains of para-cholera vibrios and 12 strains of saprophytic vibrios. The drug was also found to be non-bacteriostatic to enteric and dysenteric microorganisms.

Vitamin A Synthesis

The synthesis of biologically active Vitamin A substances was achieved by U.S. wartime research, but was kept secret for a long time under government orders to prevent it from falling into enemy hands, it was revealed recently. The procedure for the synthesis of these substances is reported to involve seven or eight chemical steps, and to make use of such chemicals as ethyl chloroacetate, beta-ionone and acetylene.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A pharmaceutical slide rule, designed for use in pharmaceutical, chemical, and allied industries, is described as affording a rapid method for converting units in the various systems of weights and measures. Some conversions contained on this slide rule are: grams per kilo to grains per pound, ounces to cc.'s and degrees C. to degrees F. **(No. 063)**

U S I

A new cleaning compound, described as a paste, is said to clean painted surfaces, enamels, tiles, porcelain, stainless steel, nickel, and chrome plate without the use of a solvent. It is claimed to be non-injurious to the hands. **(No. 064)**

U S I

New mold release agents are said to secure release of plastic or rubber materials fabricated by injection or compression molding or pressure laminating. **(No. 065)**

U S I

A new marble-like material is stated to be harder than marble and to be ten times more resistant than plaster to penetration by water. The manufacturer claims it can be sawed, sanded, polished, and generally handled like a plastic. **(No. 066)**

U S I

A new wetting agent of the fatty-amide type is described as a freely flowing amber liquid which congeals at 0 degrees C., has a mild odor, and is miscible with water, vegetable oil, fat, and waxes. **(No. 067)**

U S I

A new mildewproofing agent, described as a specially treated textile resin, is claimed to be non-toxic and non-irritating to the skin at recommended concentrations. It is reported to be water soluble and easy to apply. **(No. 068)**

U S I

A new plastic adhesive, marketed as a wine-colored liquid with a separate catalyst in powder form, is claimed to cure at room temperature with only slight pressure. It is recommended by the manufacturer as a strong adhesive for bonding wood, leather, vulcanized fiber, cloth, or paper. **(No. 069)**

U S I

A new scouring agent for wool is described as a detergent soluble in hot water. It is said to give uniform scouring action without soap. **(No. 070)**

U S I

A new injection molding plastic has been announced. It is described as light in weight and tough, with a specific gravity of 1.17 to 1.2. It is reported to have an unlimited color range and to mold to a fine finish. **(No. 071)**

U S I

A replacement for methyl orange as a standard for total alkalinity titrations is said to be extremely sensitive and to produce a clearly defined endpoint. **(No. 072)**

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Dimethyl Phthalate

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Acetoacet-ortho-anisidide
Acetoacet-ortho-chloranilide
Acetoacet-ortho-toluidide
Acetoacet-para-chloranilide
Alpha-acetylbutyrolactone
1-Chloro-2-pentanone
3-Diethylamino-2-pentanone
Ethyl Acetoacetate
Ethyl Benzoylacetate
Ethyl Alpha Oxalpropionate
Ethyl Sodium Oxalacetate
Methyl Cyclopropyl Ketone

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Ethyl Ether Absolute—A.C.S.

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OTHER PRODUCTS
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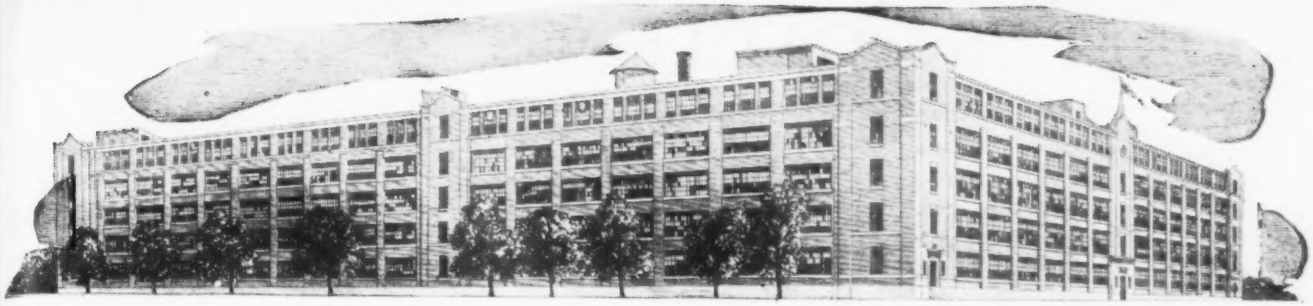

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AERO Phenyl Guanidine Stearate is a light tan waxy solid with a slight fatty acid odor. The table below summarizes some of the physical properties of this material.

Molecular weight	419
Melting point	Softens at 60°C. or 140°F.
pH of water solution	8.5 at 25°C. (less than 1% solution)
Purity	Approximately 95%
Solubility	
Water	Small amounts are dispersible in warm water
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Glycolonitrile	$HO-CH_2-CN$
Lactonitrile	$CH_3-CHOH-CN$
Dicyandiamide	$H_2N-C(:NH)NHCN$

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BOOKLETS & CATALOGS

Chemicals

A926. AMIDES. Armids, high molecular weight aliphatic amides, are discussed in a recent 4-page bulletin of the Armour Chemical Division of Armour and Co.

A927. AMINES. Armeens, high molecular weight aliphatic amines, are the subjects of a recent 6-page bulletin available from the Armour Chemical Division of Armour and Co.

A928. BUTADIENE MONOXIDE. The Columbia Chemical Division of the Pittsburgh Plate Glass Co. has issued a one-page bulletin giving the properties and typical reactions of butadiene monoxide.

A929. BUTYL DIGLYCOL CARBONATE. The general characteristics of butyl diglycol carbonate are given in a one-page bulletin (T-300) which is available from the Columbia Chemical Division of the Pittsburgh Plate Glass Co.

A930. CALCIUM HYPOCHLORITE. The Columbia Chemical Division of the Pittsburgh Plate Glass Co. has recently issued a new 4-page folder (No. A-700) giving information and charts on the use of Pittchlor (70 per cent calcium hypochlorite).

A931. CLEANING AND DRAWING COMPOUNDS. The Northwest Chemical Co. has recently issued a 24-page catalog regarding 39 different cleaning and drawing compounds.

A932. DIGLYCOL CHLOROFORMATE. The physical properties of diglycol chloroformate are given in a technical bulletin (T-100) which is available from the Columbia Chemical Division of the Pittsburgh Plate Glass Co.

A933. DDT INSECTICIDE. The Pennsylvania Salt Mfg. Co. has issued a new 8-page color booklet, describing their five Penco DDT products.

A934. FATTY ACIDS. Emery Industries, Inc. has made eight additional pages available for addition to their booklet on the manufacture and use of fatty acids, EmeryFacts.

A935. MICHROCHEMICAL SERVICES is the subject of a recent folder which is available from Foster D. Snell, Inc.

A936. NITRILES. Arneels, high molecular weight aliphatic nitriles, are the subjects of a bulletin available from the Armour Chemical Division of Armour and Co.

A937. PHOSPHORS. "Phosphors and Their Behavior in Television" titles a new 16-page booklet obtainable from the North American Philips Co., Inc.

A938. SUN-SCREENING AGENTS. Givaudan-Delawanna Inc. have recently issued a 10-page booklet describing sun-screening agents and including formulas of suitable suntan preparations.

A939. TERMITE CONTROL. "Chemicals for Termite Control" titles a recent technical bulletin (No. O-13) available from the Monsanto Chemical Co.

A940. TEXTILE FINISHING. A catalyst to speed up action of thermosetting resins in textile finishing is described in a new bulletin (No. 110) of the Textile Resin Department of the American Cyanamid Co.

Equipment—Methods

F678. AIR CONVEYOR. Process Engineers have issued a one-page leaflet describing the Convair pneumatic conveying system.

F679. BOILER. "Perfect Balance Boiler" titles a recent 4-page folder (No. 110) issued by John Philips Badenhausen, Inc.

F680. CAR UNLOADER. The Robins car shakeout is the subject of a recent 8-page bulletin (No. 128) available from Robins Conveyors, Inc.

F681. COPPER ALLOY WELDING. "Welding and Brazing of Copper and Copper Alloys" titles a 32-page book which is available from C. E. Phillips and Co.

F682. CORROSION CONTROL. The Amercoat Division of the American Pipe and Construction Co. has recently issued a 12-page bulletin describing tested solutions for difficult corrosion problems.

F683. COUPLINGS. "Falk Steelflex Couplings" are pictured and described in a recent 6-page folder (No. 4104) of the Patron Transmission Co.

F684. CRUSHERS. The Pennsylvania Crusher Co. has a 4-page bulletin available, describing their line of crushing and grinding equipment.

F685. DIESEL ELECTRIC UNIT. The complete line of diesel electric units of Consolidated Diesel Electric Corp. is described in a recent 4-page bulletin (No. CD-101).

F686. DUST CONTROL. The American Air Filter Co. has a 36-page booklet (270A) which describes their Roto Clone dust control equipment.

F687. EQUIPMENT. "Jeffrey Handling and Processing Equipment for All Industries" titles a 32-page catalog (No. 791) now available from the Jeffrey Mfg. Co.

F688. EVAPORATOR. "Griscom-Russell Bentube Evaporators" titles a recent 24-page bulletin (No. 364) available from the Griscom-Russell Co.

F689. FILTERS. The General American Process Equipment Division of General American Transportation Corp. has recently issued a new 4-page bulletin (No. 102) describing Conkey rotary disc vacuum filters.

F690. FILTERS. The FE rotary vacuum filters (string discharge) are the subjects of a 16-page booklet of Filtration Engineers, Inc.

F691. FILTERS. A series of recent case

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histories, describing the application of Niagara Filter systems, is noted in a recent 16-page bulletin (No. A-246) of the Niagara Filter Corp.

F692. FLOW INDICATORS. Full detailed descriptions of the high pressure flow indicators manufactured by Schutte & Koerting Co. are given in a 4-page bulletin (No. 18W).

F693. FLOW METER. The Bellows-differential flow meters of the Bristol Co. are described in a recent bulletin (No. F1603).

F694. GRAPHITE EJECTORS are the subjects of a recent 4-page bulletin (No. G-9) available from the Elliott Co.

F695. HEAT EXCHANGER. The American Heat Reclaiming Corp. has a new 4-page bulletin available, describing their spiral heat exchanger.

F696. HEAT EXCHANGER. "The G-R Twin G-Fin Section" titles a recent 16-page bulletin (No. 1614) which is available from The Griscom-Russell Co.

F697. HEAT EXCHANGER AND CONDENSER The Pfaudler Co. has issued a 22-page manual (No. 837) covering their standard stainless steel heat exchangers and condensers.

F698. HIGH FREQUENCY EVAPORATOR. A new evaporator of the Radio Corporation of America using high frequency radio waves as the source of energy is pictured and described in a recent 4-page bulletin.

F699. INDUCTION MOTORS are the subjects of a recent 4-page folder (No. C-118), available from Reliance Electric & Engineering Co.

F700. LIQUID BLENDING. "Continuous Automatic Ethyl Blending Facilities" titles a recent 8-page bulletin available from %Proportioneers%, Inc.

F701. LIQUID COOLER. The Niagara Blower Co. has announced the availability of a leaflet (No. 100) describing their new liquid cooler.

F702. METAL DETECTOR. The Radio Corporation of America has a new 4-page bulletin describing their electronic metal detector.

F703. METAL FABRICATION. The metal fabrication services of the Hungerford Corp. are described and pictured in a recent 16-page booklet.

F704. MIXING AND GRINDING. The application of worm gear speed reducers of various types of mixing and grinding equipment are described in a recent 4-page bulletin of the Cleveland Worm & Gear Co.

F705. MOTOREDUCERS are the subject of a recent bulletin (No. 3100), available from the Falk Corp.

F706. NATURAL GASOLINE PRODUCTION. "Natural Gas and Natural Gasoline" titles a recent 8-page bulletin available from Clark Bros. Co.

F707. PACKAGING. "Seven Facts About Low-Cost Protective Packaging" titles a 12-page booklet just off the press, available from Bemis Brothers Bag Co.

F708. PETROLEUM TESTING. A 42-page catalog (No. 699-G) titled "Tag Instruments for Testing Petroleum Products" has been made available by the C. J. Tagliabue Division of the Portable Products Corp.

F709. PILOT PLANT. A Tantalum production plant in miniature is pictured and described in a recent 4-page bulletin of the Fansteel Metallurgical Corp.

F710. PIPE AND FLARE FITTINGS. Stainless steel high pressure screwed pipe fittings and S.A.E. flare fittings are described in a recent bulletin (No. 27) issued by Bert Borders & Co.

F711. PRESSURE CONTROLLERS. "Pressure Controllers with Diaphragm Regulating Valves" titles a recent 12-page bulletin (No. 402) issued by the Leslie Co.

F712. PROCESSING EQUIPMENT. The various types of processing equipment manufactured by the Marco Co. are pictured and described in a recent 20-page bulletin.

F713. PROPORTIONING PUMP. "Chemical Treatment of Water with Wilson Pulsafeeder Proportioning Pumps" titles an 8-page bulletin (No. 242) of the Lapp Insulator Co.

F714. PROTECTIVE CLOTHING. The B. F. Goodrich Co. has just issued a new 10-page catalog section on its line of industrial protective clothing.

F715. PUMP. The Flow-Master pumps of the Marco Co. are described and pictured in a recent 12-page catalog (No. 25).

F716. PUMPS. The model 104-1 gear pump of the McIntyre Co. is the subject of a recent 4-page bulletin.

F717. PUMPS. "Worthite Pumps for Slurry Handling" titles a recent 16-page bulletin (No. W-350-B8), which is available from the Worthington Pump and Machinery Corp.

F718. PUMPS. The automatic Variflo triplex power pumps of the Worthington Pump and Machinery Co. are described in a recent 8-page folder (No. W-414-B50).

F719. PUMP AND STIRRER. The Eastern Engineering Co. has issued a new 20-page catalog covering their line of midget pumps and laboratory stirrers.

F720. PYROMETERS. The Pyrometer Instrument Co. has made a catalog (No. 150) available, describing their new Pyro immersion pyrometer.

F721. RUBBER SPRINGS. The Torsilastic rubber spring of the B. F. Goodrich Co. is the subject of a recent 16-page bulletin.

F722. SANITATION AND PROCESS EQUIPMENT. The complete line of Rex sanitation and process equipment is presented in a new 44-page book (No. 46-3) available from Chain Belt Company.

F723. SHOCK RESISTING STEEL. The Allegheny Ludlum Steel Corp. has a bulletin available on Ludlum 609 shock resisting steel.

F724. STAINLESS STEEL. The Allegheny Ludlum Steel Corp. has issued a 100-page handbook on stainless steel, including a discussion of properties, products available and fabrication methods.

F725. STAINLESS STEEL VALVES. "Aloyco Stainless Steel Corrosion Resistant Valves" titles a 4-page folder recently issued by Alloy Steel Products Co., Inc.

F726. TANTALUM HEATERS. The Fansteel Metallurgical Corp. has issued a revised edition of their bulletin, "Tantalum Heaters for Acid Solutions."

F727. VACUUM GAGE. The new Alphatron vacuum gage of the Vacuum Engineering Division of National Research Corp. is the subject of a recent 4-page bulletin.

F728. VALVES. Aloyco-20 stainless steel valves are the subjects of a recent technical bulletin (No. 2) available from Alloy Steel Products Co.

F729. TEMPERATURE CONTROLS. "Temperature Controls for Every Purpose" titles a recent folder which is available from the Burling Instrument Co.

F730. VACUUM UNIT. The hydrosteam vacuum unit is pictured and described in a recent 4-page bulletin supplement (No. 5-AA4) of the Schutte & Koerting Co.

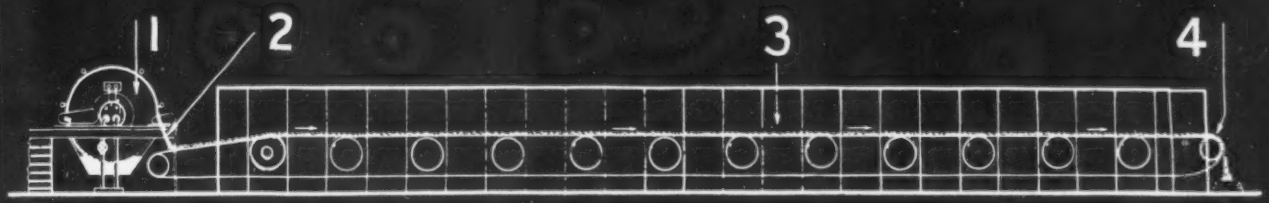
F731. STEEL. "Steel in the War" titles a 162-page book, available from the United States Steel Corp.

F732. SURFACE PYROMETERS. Cambridge Instrument Co. has just issued a new 12-page bulletin on their pyrometers.

F733. SWITCHES are the subject of a 12-page catalog (No. 200) of the General Control Co.

PROCTOR CONTINUOUS CONVEYOR SYSTEM

SPEEDS OUTPUT . . . IMPROVES QUALITY OF STARCH



1. Starch is mechanically dewatered by means of a rotary vacuum filter.

2. Having been scored on the filter, starch is delivered to conveyor of dryer in the form of ½" cubes, with a moisture content of 78.5% (B.D.W.B.).*

3. Due to the pre-forming of the starch on the filter and breaking the filter cake into ½" cubes, it is possible to dry starch rapidly—thus preventing case hardening and assuring thorough drying. Having been broken up into small pieces, it is possible for air to circulate through the bed of material on the conveyor. Temperatures average 180° F. at beginning of the cycle and 215° F. at the end.

4. Starch leaves dryer with a moisture content of 13.6% (B.D.W.B.). Capacity of dryer shown is about 4800 pounds (C.D.W.†) per hour.

*Bone Dry Weight Basis.

†Commercial Dry Weight.

The physical characteristics of starch make it a difficult product to dry in large scale production. Dried too fast—or with temperatures that are too high—case hardening results and the dispersibility of the starch in liquid is ruined. Yet, with all of these factors to overcome, Proctor engineers have developed this continuous system that cuts drying time for starch down to a matter of minutes from 12 hours. Not only that, the system assures a starch that is free from surface baking or case hardening. Naturally, this greatly increases the output capacity over that which was possible with old-fashioned kiln drying. Dried starch is cleaner, contains far less impurities and has a better color than starch dried by less recent methods. Accurate control of final moisture content is assured, and this is an important factor. This Proctor continuous drying system for starch represents one more major contribution of Proctor engineers to more efficient production in the process industries. The entire system is the outgrowth of a problem that came to Proctor research laboratories a few years ago. If you have a drying problem, you'll be on the right track by consulting Proctor engineers now!

Close-up shows ½" cubes of starch . . . the form in which it enters the dryer, after having been scored on the filter. Circulation of heated air through the bed of these cubes promotes rapid, uniform drying.

P&S **PROCTOR & SCHWARTZ · INC · Philadelphia 20 · Pa.**

HIS STATEMENTS ARE RELIABLE

THE Industrial Development Department of Alabama Power Company is staffed with a group of specialists enthusiastic about Alabama as a location for industry. Their enthusiasm stems from the fact that in past years many industries have found in Alabama the combination of climate, raw materials, workmen, transportation, market possibilities and laws not unfavorable to business.

However, they do not permit their enthusiasm to cause them to make statements which could be misleading. Their statements are based on special economic studies of an area as related to the individual industry considering locating there. If the requirements of the industry cannot be met they will state so frankly and endeavor to suggest an alternate.

Currently the interest displayed in Alabama as an industrial location makes it impossible for them to complete, as promptly as they would like to, economic reports for specific organizations. However, if you are contemplating the establishment of a plant in the South they would be pleased to have your inquiry and will begin the compilation of facts from which you can make a decision. They will undertake this independently but can, of course, prepare a more helpful report if they work in collaboration with your representatives.

Industrial Development Department

ALABAMA POWER COMPANY

BIRMINGHAM, ALABAMA

NEWS OF THE MONTH

Plan Streamlining of Patent Office

A REORGANIZATION of the Patent Office intended to speed up decisions on patent applications is now under consideration. Both the Department of Commerce—under which the Office functions—and the Bureau of the Budget, are conducting studies to determine what procedural changes should be recommended to streamline the work of the patent division.

Such a revision of procedure is long overdue, for deluged with patent applications, and hampered by a severe shortage of examiners, the Patent Office has averaged only 431 patents weekly, so far this year, compared with a prewar issuance of 800.

Although the so-called twenty-year law, which provides for the validity of patents for a period of 20 years, rather than the present 17 years, but with limitations on the period of examination, is now pending in Congress, patent officials doubt that it will pass at this session. They are eager, however, to have lower limits placed on the time under which patent applications may remain in the Bureau without decision. Under existing laws, such lapses may extend to seven years, but the Bureau seeks a five-year maximum, and feels that an average three-year period is attainable.

Several recommendations have been made, and are under consideration, to expedite patent issuance. A primary move necessary, according to officials, is centralization of the Patent Office. Existing as it does, with one third of the examiners in Washington, and two-thirds in Richmond, efficiency has long been impaired.

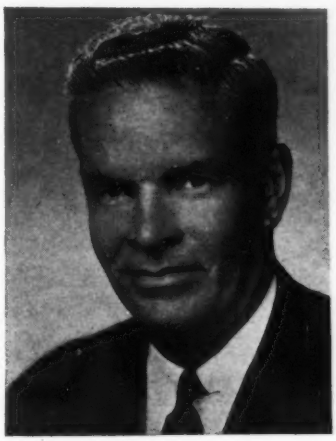
Actual expansion of the examining staff is also regarded as essential, for already understaffed, postwar research is expected to yield numerically more patent applications, and impose a still heavier burden on the Bureau's facilities.

Simplification of regulations governing applications is also in prospect, embodying streamlining of the application forms, but not by any lowering of the standards now in force re the submission of detailed drawings and claims. Too, standardization of rules among government agencies as to the disposition of patents obtained by employees is sought, so that the Patent Bureau will not have to devote time to "referee" duties.

Included in the many bills on patents now pending in Congress are proposed laws which would accomplish all the Patent Office reforms sought. However, Congress does not appear to be disposed toward acting on any of these matters at this session.

Hence, the independent survey has been completed in an effort to speed up Patent Office affairs, for several of the proposals outlined do not require Congressional approbation, other than for the allocation of funds to employ additional examiners. Even these moneys might be obtainable from general Dept. of Commerce appropriations.

Directs Celanese Petroleum Chemical Research



Joseph E. Bludworth, appointed director of petroleum chemicals research and development by Celanese Corp. Mr. Bludworth supervised the company's preliminary petroleum research program at Cumberland, Md., and more recently has been concerned with starting-up operations at the Bishop, Texas, unit.

Columbia Extends Caustic-Chlorine Holdings

Pittsburgh Plate Glass Co., through its Columbia Chemical Division, has materially expanded its activities in the caustic-chlorine field during the past month, through its purchase of the Natrium, West Virginia, unit from the RFC, and the leasing of a major portion of the government-built Lake Charles, La., plant, by its affiliate, Southern Alkali Co.

The Natrium project was built and operated by Columbia for the DPC, and came into production in July, 1943. Representing one of the largest chlorine producing plants ever built east of the Mississippi, it is located about 30 miles from Wheeling, and utilizes salt brine pumped from 6000 foot wells. In that both rail and water transportation are readily available, special barges for the transportation of liquid chlorine and caustic soda can be employed.

Southern Alkali Corp., jointly owned by Cyanamid and Pittsburgh Plate, has leased a major part of the $52,000,000 government-owned plant at Lake St. Charles and will convert its facilities during the year to chlorine-caustic production. Designed and operated by the Mathieson Alkali Works, using the Trail-Mathieson electrolytic cell, the Lake St. Charles plant functioned for a few months as a magnesium source, but operations were ordered suspended in March, 1944.

Southern Alkali will use the existing power generating facilities, and will utilize Hooker type-F chlorine caustic cells. It is estimated that output from the recently acquired unit will more than double Southern's chlorine and caustic capacity. Thereby it will rank as the southwest's largest operator.

Heyden Invests Heavily in American Potash

Held by the Alien Property Custodian since Oct., 1942, 478,194 shares of the outstanding capital stock of American Potash and Chemical Corp. was sold for $15,440,884.26 last month to a syndicate consisting of Glore, Forgan & Co., Kuhn Loeb & Co., and Lehman Bros. The bid from this group—which was the only one received—represented $32.29 per share, and was later offered on the market at $35.00.

Maintaining its principal executive offices in Los Angeles, with sales headquarters in New York, American Potash owns a plant at Trona, Cal. and 2,560 acres at Searles Lake—a "dry lake" yielding potash salts. In addition it controls two small domestic subsidiaries and an English unit.

One significant feature is the fact that Heyden Chemical Co. bought the largest single block of the stock offering, namely, 100,000 shares, representing 18.9 per cent of the issue.

WAC Toluol Price Policy Set

A single flat price of ten cents a gallon for surplus toluene, applicable to all users, is announced by War Assets Corp. This action was taken to accelerate the disposal of approximately 15 million gallons of toluene owned by the government, which is roughly equivalent to a normal nine months' supply.

Until now toluene has been marketed by WAC at a two-price level—a fact

which led to Congressional investigation, and the eventual decision noted. The price to the petroleum industry, for use as fuel, has stood at 10 cents a gallon, while gallonage for export was placed in the 27 cent bracket. Too, a WAC restrictive order, which by limiting end-uses, prohibited domestic sales to the paint, lacquer, varnish, and general chemical industries.

Currently, a Senate subcommittee is investigating charges that the $15 million toluol plant, operated by Humble Oil during the war, is being sold with the understanding that none of its output—some 70 million gallons annually—will be made available to chemical or paint manufacturers. WAC's contention; any other practice would disrupt normal coke oven-consumer trade, and the toluol is not needed by this 30 million gallon a year market.

Schwerdt Appointed Victor Treasurer

Frank A. Schwerdt, has been appointed treasurer of Victor Chemical to succeed G. W. Christopher, retired. Mr. Schwerdt joined Victor in 1927 as an accountant.

Fertilizer Chemical Shortage Continues

At a meeting of the Committee on Fertilizers of the Combined Food Board in Washington recently, all members agreed that it is desirable for the Committee to continue its work during the 1946-47 fertilizer year in view of the prospect for continuing shortages of many fertilizer materials. Preliminary estimates indicate deficits of approximately 457,000 short tons of nitrogen and approximately 3,100,000 long tons of phosphate rock. Supplies of potash will be adequate only if the prewar level of production in Germany can be realized and the necessary transport can be mobilized. Prospective production data is being assembled and the Committee proposes to reach agreements regarding preliminary allocation recommendations for the 1946-47 fertilizer year before the end of May.

Reports from North Africa indicate improved production of rockphosphate, due in part to mining supplies shipped from the United States and the United Kingdom. European potash production shows some improvement but is still far from sufficient to meet the urgent requirements of Europe and the United Kingdom.

To meet crop needs in the American and British zones of Germany the Committee agreed to shipment of soluble phosphates from Belgium for use during this crop year. Because of India's situation, the Committee also agreed to additional shipments of ammonium sulfate to India in April from an extremely short world supply.

Casein Ceiling Price Eased

Producers of industrial casein may now sell casein at present ceiling prices and bill the purchaser for an additional amount as soon as the OPA announces new and higher ceilings.

This adjustable pricing arrangement is necessary, the agency said, to make possible continued domestic production.

Present supplies of this casein are dwindling, largely because foreign prices have gone far above the present domestic ceiling of 24¢ a pound. Thus, no importation is possible.

OPA is now considering cost data and expects to announce shortly a new ceiling that will make it possible to get the increased domestic production essential to the manufactured products that use casein as an ingredient.

New Sulfuric Unit For Du Pont

Plans have been approved by E. I. du Pont de Nemours & Company for the eventual construction of a sulfuric acid plant on the James River in Bellwood, nine miles southwest of Richmond, Va.

The plant, which will be operated by the Grasselli Chemicals Department, will cost approximately $1,500,000. It will be located on a 425-acre site recently purchased by du Pont and will produce sulfuric acid for local consumers who previously relied on supplies shipped into the area.

Sulfur for the James River Works, as it will be called, will arrive in ocean-going vessels at the Richmond Deepwater Terminal. The du Pont James River Works will be connected by a 2,000 foot spur to the Seaboard Airline Railway.

Construction will start when proper Federal approval is obtained and materials are available.

Monopoly Charges Dismissed by FTC

A monopoly complaint against the Chilean Nitrate Sales Corp. and the Barrett Co., both of New York, has been "dismissed without prejudice" according to a Federal Trade Commission announcement.

The companies had been charged with conspiring to monopolize the sale of raw nitrate of soda and to fix prices. The Commission statement said that Justice Dept. proceedings "have disposed of the conspiracy charges" and the Commission "would not be warranted in proceeding."

Hall Promotes Stevens

Thomas L. Stevens has been appointed vice-president of C. P. Hall Co., Akron to succeed the late Arthur E. Warner. Mr. Stevens joined the Hall organization in 1930, after spending three years with Firestone.

Major Expansion Planned by Monsanto

Monsanto Chemical Co. has some 130 projects listed in its postwar expansion program, involving $50 million of capital expenditures within the next two years. If equipment and labor is available this year, some $25 million will be committed to immediate extensions.

Among the undertakings being discussed, according to President William M. Rand, are those for new or increased production of sulphuric acid, nitrochlorobenzene, paranitroaniline, maleic anhydride, DDT, polystyrene, synthetic caffeine and detergents. In addition, the research laboratories have developed 57 chemicals in 1945, the potentialities of which have not as yet been appraised.

New Facilities for Cyanamid

Expansion planned by American Cyanamid Co. "for the immediate future" includes new construction or additions to facilities at a minimum of six different locations, W. B. Bell, president, revealed to stockholders in the annual report.

Among the new additions and improvements now planned are included a new plant at Gloucester City, N. J., for titanium dioxide pigments and one at Willow Island, W. Va., for further expansion of production of pigments, organic chemicals and pharmaceuticals.

Additions are scheduled for penicillin producing facilities at Pearl River, N. Y., while at Bridgeville, Pa., and Wal-

lingford, Conn., expansion of synthetic resins and plastics capacity is scheduled.

Moreover, Jefferson Chemical Co., Inc., equally owned by American Cyanimid and Texas Co., is proceeeding with the construction of a plant at Port Neches, Tex., for the production of chemicals derived from petroleum.

Ozark Extends Sulphuric Capacity

The Ozark Chemical Company, wartime operator of the Ozark Chemical Defense Corporation plant at Tulsa, Okla., is extending its present five-year lease of the plant's 200-ton-a-day sulphuric acid unit to include the plant's remaining sulphuric acid unit which has a capacity of 120 tons daily, the War Assets Administration has announced.

Ozark Chemical leased the 200-ton-a-day sulphuric acid unit in November, 1945, for a five-year period. As a result of increased demands for acid, the company plans to operate the entire facilities of the plant.

Austin Advanced to Presidency by Kellogg

H. R. Austin has been advanced to the presidency of the M. W. Kellogg Co. in the first major change effected in the company's executive personnel since its founding in 1905. Mr. Austin was formerly vice-president. M. W. Kellogg is now board chairman.

Offer Research Grants

Grants of up to $10,000 a year for five years to aid research in agricultural chemistry are being offered to universities and other non-profit research institutions throughout the country by the Herman Frasch Foundation for Chemical Research, it is announced by the United States Trust Company of New York, trustee of the Foundation.

Applications for grants must be submitted before July 1. Each application should describe the research project the institution desires to undertake, the facilities available for carrying out the project, the qualifications of personnel to be assigned to it, the anticipated time for completion, and an itemized estimate of annual expenditures for salaries, apparatus, supplies and the like.

Proposals are to be sent in duplicate to the United States Trust Company of New York, 45 Wall Street, New York 5.

CALENDAR *of* EVENTS

AMERICAN ASSOCIATION OF CEREAL CHEMISTS, annual meeting, General Brock Hotel, Niagara Falls, Canada, May 13-16.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, western convention, Palace Hotel, San Francisco, Aug. 25-28.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS will celebrate its 75th anniversary at the Waldorf-Astoria, New York, September 16-18, 1946.

AMERICAN OIL CHEMISTS SOCIETY, 37th annual meeting, Roosevelt Hotel, New Orleans, May 15-17.

AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION, annual convention to be held jointly with Canadian Pharmaceutical Manufacturers' Association, Lake Louise, Alta., Canada, June 10-12.

AMERICAN SOCIETY FOR TESTING MATERIALS will hold the 49th annual meeting in Buffalo, N. Y., June 24 to 28, 1946.

CANADIAN CHEMICAL CONFERENCE, annual meeting, Royal York Hotel, Toronto, June 24-26.

FLAVORING EXTRACT MANUFACTURERS' ASSOCIATION, annual meeting, Drake Hotel, Chicago, June 2-4.

MID-AMERICAN EXPOSITION, Public Hall, Cleveland, Ohio, May 23-June 2.

NAIDM, mid-year meeting, French Lick Springs Hotel, French Lick, Ind., June 17-19.

NATIONAL CHEMICAL EXPOSITION will be held at the Chicago Coliseum, Sept. 10-14.

NATIONAL FERTILIZER ASSOCIATION, annual convention, French Lick Springs Hotel, French Lick, Ind., June 10-12.

ANNUAL INSTRUMENTATION CONFERENCE and Exhibit, Hotel Wm. Penn, Pittsburgh, Sept. 16-20.

PRODUCTS OF TOMORROW EXPOSITION will be held at the Coliseum in Chicago, April 27-May 19, 1946.

Standard Plans Major Expansion

Standard Oil Co. (Indiana) and subsidiaries plan to spend some $150 million this year on new petroleum facilities, according to Robert E. Wilson, chairman of the board. The contemplated expenditure is nearly twice the $77 million allocation of 1944.

Wyandotte Transfers Burchfield

Paul Burchfield, appointed assistant director of technical service by Wyandotte Chemicals. Dr. Burchfield formerly was assistant supervisor of the company's engineering research department.

Higher Earnings for Newport Forecast

With the elimination of excess profits taxes and a 10 to 15 per cent increase in production capacity, Newport Industries, Inc., can expect substantially higher earnings in 1946 than last year, according to John H. McCormack, president.

Sales volume this year is expected to be higher than in 1945, with an easing in the labor situation.

Will Soon Release German Dye Secrets

Department of Commerce investigators, under the direction of F. O. Robitschek of the Marietta Dye Corporation, Marietta, Ohio, are now collecting complete manufacturing data on German dyestuffs

Chemical Company Earnings Reports Summarized

Company	Period	Sales 1945	Sales 1944	Net Profit 1945	Net Profit 1944
Abbott Laboratories	Year to Dec. 31	$37,929,521	$38,400,000	$3,156,794	$3,039,512
Air Reduction Co.	Year to Dec. 31	$80,689,257	$97,948,780	$8,278,048	$5,877,176
American Cyanamid	Year to Dec. 31	Not revealed	Not revealed	$6,213,054	$6,660,144
Celanese Corp.	Year to Dec. 31	$104,197,237	$101,655,680	$7,613,489	$7,235,189
General Aniline	Year to Dec. 31	$68,659,000	$73,311,178	$3,659,992	$3,591,929
B. F. Goodrich Co.	Year to Dec. 31	$372,082,813	$412,294,119	$12,213,501	$12,015,842
Heyden Chemical	Year to Dec. 31	$17,155,748	$16,412,628	$1,403,342	$1,397,711
Koppers Co., Inc.	Year to Dec. 31	$118,000,000	$126,000,000	$3,200,306	$2,900,000
National Lead Co. (and wholly owned domestic subsidiaries)	Year to Dec. 31	$167,562,928	$166,168,715	$6,538,508	$7,563,754

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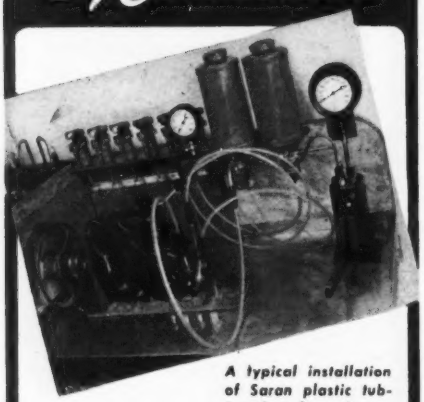

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in the British, Russian, and French zones, as well as the American. It is estimated that production "know how" for not less than 50,000 dyestuffs and intermediates will soon be available to American industry through the Office of the Publication Board. A large percentage of these dyestuffs are unknown in the United States.

Not only will this windfall of information mark at least a five-year advance in the American dye industry, but it will save millions of dollars in terms of new products and man-hours of research, the government states.

Nitrogen Survey Released

Detailed estimates of German synthetic nitrogen fertilizer production for 1945-1946 and a study of the condition of the German synthetic nitrogen plants are presented in a report issued by the office of the Publication Board, Department of Commerce.

The study was made during the summer of 1945 by American technical investigators who visited the more important German nitrogen fertilizer plants, including the I. G. Farben plant at Leuna, the largest ammonia plant in the world. Prior to bombing, its annual capacity was rated at 365,000 tons of ammonia, calculated as nitrogen.

Commerce Department Invites Suggestions

The Department of Commerce, Washington 25, has recently published a detailed description of the Current Manufactures Statistics Program of the Census Bureau.

In addition to a list of the monthly, quarterly, and annual industry surveys involved it provides a description of the proposed new quinquennial program, annual manufactures yearbook, and other relevant information.

The Department, which has developed its manufactures report in cooperation with industry, invites the comment of interested businessmen on the contemplated program, so that it may more adequately provide the information most needed.

COMPANIES

Textile Research Unit For Cluett, Peabody

Ground will be broken this month for a new $600,000 research laboratory which will carry on scientific investigations on a scale without precedent in its industry. C. R. Palmer, president of Cluett, Peabody, reported at the company's annual meeting.

Mr. Palmer said that the company's enlarged research program under the direction of E. C. Pfeffer, Jr., research director, will be carried out along broad general lines which will include chemical process studies, textile research, mechanical process research and fundamental research into such projects as the development of new synthetic fibers. Other studies will deal with non-woven fabrics, improvements in plastics, new textile finishes and chemical fabric processes, improvements in methods of dyeing, scientific studies of non-woven fabrics and non-shrinking threads and the development of new equipment.

Pennsalt Names Moffitt

T. E. Moffitt, has been appointed sales manager of Pennsylvania Salt Mfg. Co. of Washington, with headquarters at Tacoma. Before joining Pennsalt, Mr. Moffitt was with Hooker Electrochemical and Weyerhauser Timber Co.

Lion Chemical Acquires Fertilizer Unit

Lion Chemical Corp., a subsidiary of Lion Oil Co., has taken a 5-year lease on the Government-owned Ozark Ordnance Works near El Dorado, Ark., and will spend $1,000,000 to convert the plant to the manufacture of fertilizer.

Conversion work on the unit will require six months to complete.

Tennessee Buys Government Plant

Designed to produce coke and by-products, such as coaltar, benzol, toluol, ammonium sulphate and gas, the Tennessee Products Corporation plant at Chattanoogo, Tenn., has been sold to that company for $600,000, the War Assets Administration has announced.

The same type of products will be produced for postwar civilian consumption.

Wyeth Cuts Penicillin Tablet Price

First fruit of Wyeth, Inc.'s, penicillin expansion program, announced early in 1946, has materialized in the form of a 50 per cent reduction in the price of its penicillin tablets, "Penioral."

The new price brings the cost of penicillin in this tablet form down to the same

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New Specialty Organics Concern

Arapahoe Chemicals Inc. is being organized with head offices in Boulder, Colo., to specialize in the manufacture of small quantities of organic chemicals for sale to research laboratories, pilot plants, educational institutions, and pharmaceutical houses.

Founders of the concern are five University of Colorado men—John W. Bartram, Oscar B. Jacobson, Thomas D. Waugh, Richard C. Waugh, and Robert D. Inman.

Armstrong Installs Pilot Plant

A "pilot plant" designed primarily for development work on resilient floorings and wall coverings has been installed in the research laboratories of the Armstrong Cork Co., Lancaster, Pa.

Armstrong looks to the plant to yield fundamental information on the blending, mixing and forming of all types of compositions in which dry fillers and pigments are combined with plastic binders, such compositions including—besides linoleum—rubber and synthetic rubber, asphalt tile and synthetic resins.

Mutchler Forms Company

The Mutchler Chemical Co., with offices at 258 Broadway, New York, has been formed to act as a manufacturers' agent and distributor of fine chemicals, essential oils, gums and waxes.

George W. Mutchler, who heads the concern, was formerly with McKesson and Robbins, Inc., and previously with General Chemical.

DuPont Plans Cellophane Research Laboratory

A $400,000 laboratory for cellophane research will be built in Buffalo at the Yerkes works of E. I. du Pont de Nemours & Co., Inc., according to company officials.

The new unit will be devoted to the improvement of existing cellophane films, and the development of new types, in keeping with the policy of maintaining the Yerkes plant as the corporation's main cellophane research center.

Plan Bolstered Output of Pine Distillates

The Retort Chemical Division of the Cabot Carbon Company, a subsidiary of Godfrey L. Cabot, Inc., of Boston, announces that contracts have been signed and construction is under way at Gainesville, Florida, on expansion of facilities for distilling pine tars and oils.

At present there are four retorts at Gainesville, with a monthly production

of 65,000 gallons. The two new retorts will increase output by about 50 per cent, to a figure estimated at between 95,000 and 100,000 gallons a month.

New Gum Plant

An $80,000 gum producing naval stores plant is being built at Palatka, Fla., by the Palatka Gum Processing Corp. It is expected to be in full production by mid-July.

Heads Sales Development

Sam L. Brous, has been named manager of sales development by B. F. Goodrich Chemical. He will be responsible for the introduction of new chemicals and plastics, prior to actual marketing by the regular sales staff.

St. Regis Plans New Southern Mill

Roy K. Ferguson, president of St. Regis Paper Co., told stockholders at the annual meeting that the company is planning construction of a new kraft paper mill "somewhere in the South." The new plant should be ready for production in 1948 and he estimated it would cost $10 million.

NOPCO Stockholders Authorize Stock Issue

An increase in the authorized capital stock of the National Oil Products Co., chemical manufacturers, of Harrison, N. J., from 300,000 to 500,000 shares, was voted at the recent annual stockholders' meeting.

"It is not contemplated than any of this increased capital stock will be issued at the present moment," Charles P. Gulick, president and chairman of the board, explained. "However, as a result of this authorization, the Board of Directors is now in position to act expeditiously should occasion arise permitting the acquisition of properties of any character when all or part of the transaction might be consummated through a stock issue."

International Minerals Plans Stock Issue

International Minerals & Chemical Corporation has announced that common

ONE of the tales Shahrazad told her King, during her thousand and one Arabian Nights, was the story of the jinni, sealed in a bottle, who came out at his master's bidding to expand to gigantic size and perform miracles.

Sealed for delivery in a 26-ton tank car, 1,349 cubic feet of liquid Anhydrous Ammonia will, upon release from its steel bottle, make 1,144,000 cubic feet of Ammonia gas. Used as a liquid, or as a gas, or as a basic chemical from which other products are made, Ammonia performs miracles beyond the dreams of Shahrazad.

When liquid Ammonia expands to a gas, it produces cold by absorbing heat. By this process, Ammonia makes ice, quick-freezes fruits and vegetables, refrigerates perishable food and air-conditions buildings.

Ammonia is used in the production of water-purifiers, sulfa-drugs, anti-malarials and vitamins . . . Ammonia serves as a solvent to extract certain metals from their ores . . . Ammonia is a reagent employed in making synthetic rubber, high-octane gasoline, leather, industrial alcohol, alkalies and glass . . .

Metal technologists crack Ammonia (NH_3) back to its original gases, a mixture of Nitrogen and Hydrogen, to surface-harden metals and for use as a protective atmosphere to bright-anneal metals.

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WRITE FOR DETAILS

shareholders will be asked to approve the sale of 145,834 shares of the corporation's common stock presently authorized and unissued. The board of directors has approved the calling of a special meeting of stockholders for May 20.

If the shareholders authorize the sale of this stock, rights will be given to present shareholders to purchase additional shares on the basis of one new share for each five common shares owned as of a record date to be determined later. The plan further proposes that 14,000 shares of the aforementioned 145,834 common shares will be reserved for purchase by officers and employes of the corporation at the market price.

Goodrich Awards Plastics Plant Contract

The Batson-Cook Company of West Point, Ga., has been given the general contract for the new $4,000,000 plastics processing plant which The B. F. Goodrich Company is building near Marietta, Ohio, it is announced by H. E. Cook, chief engineer.

With a main building having approximately 120,000 square feet of floor space, and auxiliary and service structures having an additional 44,000 square feet, the plant will be located on 66 acres along the Muskingum River.

Hardy Units Amalgamate

Effective April 1, 1946, by unanimous consent of the stockholders of both corporations, Charles Hardy, Inc., and the Hardy Metallurgical Company were merged into a single organization which will operate under the trade-style of Charles Hardy, Inc., a Delaware corporation.

The officers of the new corporation are: president, John D. Dale; vice-president, in charge of sales, F. H. Mulligan; vice-president, in charge of research and development, J. J. Cordiano; secretary, Samuel V. D. Kilbourn.

Brewer Buys Vitamin Producer

Brewer & Co., Inc., Worcester manufacturers of pharmaceutical products, has purchased the vitamin capsulating division of the Atlantic Coast Fisheries Co.

The Atlantic unit has a capacity of 30 million capsules per month which have been marketed under the trade name, "Emulsicaps." In addition to the actual facilities Brewer has also acquired all domestic and foreign patent rights held by Atlantic on its capsulating processes.

Standard Establishes Fellowships

The establishment of 22 graduate fellowships at 17 educational institutions by Standard Oil Company (Indiana) has

been announced by Robert E. Wilson, chairman of the board.

Fellowships in chemistry have been established at Northwestern, Illinois, Chicago, Wayne, Ohio State, Wisconsin, Iowa State, and Johns Hopkins; in chemical engineering at Massachusetts Institute of Technology, Minnesota, Illinois, Cornell, Carnegie Tech, and Princeton; in engineering at Michigan, Minnesota, Iowa, Illinois, Purdue, and Illinois Institute of Technology; in civil engineering at Purdue; and in marketing and management at Northwestern.

The fellowships will be awarded to students working for master's or doctor's degrees and will vary somewhat in amount, depending on the tuition and other fees at the various institutions, but the average for each fellowship will be approximately $1,500 a year. The work done will be basic research, and the results will be published in accordance with the usual academic practice.

MMR Finances Chlorophyll Research

The Northeastern Wood Utilization Council has announced that it has established a fellowship in the Graduate Department of Chemical Engineering at Yale University sponsored by the essential oil firm, Magnus, Mabee & Reynard, Inc., New York.

The topic for investigation will be "Chlorophyll and Other Extractives From Green Plants and Leaves" and will deal with the economic extraction of these materials for medicinal, deodorizing and feed purposes.

Company Notes

CHAS. PFIZER & Co., has established a west coast branch at San Francisco under the management of Robert G. von Bermuth. Complete stocks will be warehoused at the new location, with sales office headquarters at 605 Third St.

The offices of the Metropolitan District Sales Division, Dyestuff Department, of the CALCO CHEMICAL are now at 30 Rockefeller Plaza, New York, N. Y. Paul J. Luck, metropolitan district sales manager, will be in charge of all sales activities of the department.

DAVISON CHEMICAL CORP. has purchased the Union Trust Co. building at Baltimore as office headquarters.

E. I. DU PONT DE NEMOURS & Co. plans to spend $75 to $100 million on expansion if Federal regulations permit, according to W. S. Carpenter, Jr., president.

THE WILSON CHEMICAL Co. has opened a New York office at 35 Water St., New York 4.

WINTHROP CHEMICAL COMPANY, INC., has opened a professional service office in the Widener Building, Philadelphia, with

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Reilly Refined Coal Tar Chemicals

● Listed here are a few of the refined chemicals from coal tar that are now commercially available through Reilly research and development. Most of the products listed have not before been offered in quantity. Many of them have promise of usefulness to industry and to the nation.

These products, all of which are available in 90% or higher purity, have a wide range of applications, including: Pharmaceuticals, insecticides, fungicides, antiseptics, rubber chemicals, additives to gasoline and lubricants, photographic compounds, dyestuffs, plastics, printing inks, and in the synthesis of organic chemicals.

Further information on any of these products gladly furnished on request.

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ANTHRACENE
CHRYSENE
DIMETHYLNAPHTHALENES
FLUORANTHENE
FLUORENE
METHYLNAPHTHALENES
2-METHYLNAPHTHALENE
NAPHTHALENE
PHENANTHRENE
PYRENE

Acids

M-CRESOL
O-CRESOL
P-CRESOL
M-ETHYLPHENOL
P-ETHYLPHENOL
1,3,5-METHYLETHYLPHENOL
PHENOL
1,2,4-XYLENOL
1,3,4-XYLENOL
1,3,5-XYLENOL
1,4,2-XYLENOL

Bases

2-AMINO-3-METHYLPYRIDINE
2-AMINO-4-METHYLPYRIDINE
2-AMINO-5-METHYLPYRIDINE
2-AMINO-6-METHYLPYRIDINE
2-AMINOPYRIDINE
2-AMYLPYRIDINE
4-AMYLPYRIDINE
2-ETHANOLPYRIDINE
4-ETHANOLPYRIDINE
2-HEXYLPYRIDINE
ISOQUINOLINE
LEPIDINE
2,6-LUTIDINE
3-METHYLISOQUINOLINE
2-(5-NONYL)PYRIDINE
4-(5-NONYL)PYRIDINE
ALPHA PICOLINE
BETA PICOLINE
GAMMA PICOLINE
2-PROPANOLPYRIDINE
4-PROPANOLPYRIDINE
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William J. Hoeler, formerly assistant manager of the Boston office, manager in charge.

As of May 1, the administrative offices of BITUMINOUS COAL RESEARCH, INC., national research agency of the bituminous coal industry, were moved from 719 Oliver Building to 912 Oliver Building, Pittsburgh 22, Pa.

Farst Promoted by Pittsburgh

Walter K. Farst, with Pittsburgh's Columbia Chemicals Division for 23 years, and chief engineer in several of the company's chemical projects in the past five years, has been appointed general manager of its Zanesville, Ohio cement unit.

ASSOCIATIONS

Electrochemists Elect Officers

At the Congress of the Electrochemical Society held at Birmingham, Alabama (April 11 to 13), the following new officers were elected: president—Wm. C. Moore, New York; vice president—A. L. Ferguson, University of Illinois; treasurer—W. W. Winship, New York; secretary—Colin G. Fink, Columbia University.

AIChE Western Meeting

Plans for the Western convention of the American Institute of Chemical Engineers, the first such meeting in the West since 1924, are now taking shape. The meeting will be held in San Francisco, with the Palace Hotel as headquarters, during August 25-28.

The program, which will stress western industry, will include a symposium on chemicals from petroleum and another on chemical engineering education in the West. Another symposium will feature 15 thumbnail sketches of new chemical processes put into operation in the West since 1940. Among the processes now tentatively scheduled to be described will be those for the production of phthalic anhydride from ortho-xylene, potassium perchlorate, magnesium by the

modified carbothermic process, penicillin, tartrate recovery and low-temperature carbonization of coal. A number of plant visits in the Bay area are being scheduled.

General chairman of the meeting is C. R. Nelson of Shell Development Co., San Francisco. A. George Stern of Westvaco Chlorine Products, Newark, Calif., has charge of accommodations and reservations, while George C. Gester, Jr., of California Research Corp., Richmond, will handle all arrangements for plant visits.

APMA Convention Scheduled for June

The Canadian Pharmaceutical Manufacturers' Association has accepted the invitation of the American Pharmaceutical Manufacturers' Association to meet jointly with it at the APMA's annual convention which opens June 10 at Lake Louise, Alberta, Canada.

The president of the Canadian Pharmaceutical Manufacturers' Association, R. H. Thompson, of the E. B. Shuttleworth Chemical Company, Toronto, will deliver the collaboration address at the opening session. The program for the three-day meeting has not yet been completed.

Corrosion Engineers Convene

Among the papers presented at the annual convention of the National Association of Corrosion Engineers, held at Kansas City, Mo., on May 7, 8 and 9, were the following of particular interest to the chemical industry:

Clad Steel Processing Equipment, E. C. Gosnell, Lukens Steel; Corrosion by Aqueous Solutions in the Absence of Oxygen, N. E. Berry, Servel Corp.; Condenser Tubes of Aluminum Alloys, R. B. Mears, Alcoa; Permeability and Corrosion in Protective Coatings, D. F. Siddall, U. S. Stoneware; and Application of Carbon and Graphite to Resist Corrosion, C. E. Ford, National Carbon.

The chemical industry section was under the chairmanship of Paul W. Bachman.

New England Club Officers

At the annual meeting of the Chemical Club of New England, held early last month at Boston, the officers elected for 1946 were: A. A. Lawrence, Dow Chemical, president; J. J. Krackeler, du Pont, vice-president; R. B. Anthony, Solvay Sales, secretary; and D. C. Knapp, Mitchell-Wing Co., treasurer.

PERSONNEL

Receive Franklin Medal

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ZINC SILICO FLUORIDE

POTASSIUM SILICO FLUORIDE

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Oxford University, as 1946 recipients of the Franklin Medal is announced by Henry Butler Allen, secretary and director of The Franklin Institute.

Named to Survey German Developments

Eleven experts from various branches of the chemical industry have been assigned to investigate German technical developments the Technical Industrial Intelligence Branch, Dept. of Commerce, has announced.

They are: Julius Alsberg, CWS; Henry H. Blau, Federal Glass; W. C. Gardiner, Mathieson Alkali; C. J. Harbert, Harshaw Chemical; H. E. Houser, Dow Chemical; E. H. Karr, Pennsalt; F. P. Lester, Douglas Mfg.; C. E. Lyon, Diamond Alkali; F. H. Mc Berty, du Pont; J. J. Peel, Ford Motor; K. C. Rule, Westvaco.

MacMullin Enters Consulting Field

Robert B. MacMullin, former manager of development for Mathieson Alkali, has opened an office at 8249 Troy Ave., Niagara Falls, as a chemical engineering consultant. Mr. MacMullin has recently returned from a six-month tour of Germany as Technical Coordinator for Foreign Economic Administration and the Dept. of Commerce.

Naugatuck Appointments

H. Douglas Tate, entomologist, and Travis W. Brasfield, plant pathologist and mycologist, have joined the staff of the United States Rubber Company's agricultural experiment station at Bethany, Conn., it is announced by George L. McNew, director of the company's agricultural laboratories.

Both men will engage in research for new agricultural chemicals as well as continue the laboratory and field testing of insecticides, herbicides and fungicides produced by the Naugatuck Chemical Division of the rubber company at Naugatuck, Conn.

Hercules Staff Transfers

Six members of the Paper Makers Chemical Department of Hercules Powder Company have been appointed to new positions, effective May 1.

Thomas G. Batchelor, resident manager of Hercules Powder Company (Canada) Ltd., will move to Wilmington, Del., as assistant director of sales of the department. He has been resident manager of the Hercules Canadian subsidiary since 1937, and was elected to the board of directors last September.

E. Hoke Martin, PMC sales representative at Kalamazoo, Michigan, will succeed Mr. Batchelor as resident manager of the Canadian plant.

Henry Reeves, Jr., now with the Paper Makers Chemical Department in Wilmington, becomes departmental sales representative at Kalamazoo succeeding Mr. Martin and Henry L. Mellen, formerly sales representative at Holyoke, Mass., has been appointed assistant manager at that location.

Thomas L. Stirling, with the Industrial Chemical Division of the Hercules PMC Department in New York City, will join the paper chemical sales staff at Holyoke. He will be succeeded in New York by L. E. McKenzie, formerly resident manager of the Industrial Chemical Division's Boston, Mass., office.

Monsanto Promotions

Appointment of Paul G. Marsh as assistant production manager of the Organic Chemicals Division of Monsanto Chemical Company, and the promotion of A. J. Pastene to succeed him as manager of the company's John F. Queeny plant in St. Louis, is announced by Osborne Bezanson, vice president and divisional general manager.

E. T. Stehlby, formerly manufacturing superintendent, was promoted to the newly-created position of assistant plant manager of the John F. Queeny plant. At the same location, Roy G. Hemminghaus, Walter Meyer and J .W. McCrackin were named manufacturing superintendents.

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Personnel Notes

THOMAS FRANCIS MURPHY has been named assistant commissioner of patents, to succeed Conder C. Henry, who resigned recently.

Allied Asphalt & Mineral Corporation announces the election of HEINZ W. KRAAZ, of its Wax and Oil Division, as a vice president of the company.

BORIS SCHWARTZ has been appointed chief research chemist for the Hart Products Corporation, manufacturing chemists, New York City, it is announced by Ralph Hart, president.

CHARLES D. CORVELL, who is distinguished for his work in the inorganic and physical chemistry of the isolation and identification of radioactive atoms, has been appointed professor of chemistry at the Massachusetts Institute of Technology.

Calgon, Inc. announces the appointment of GOLDEN LATSHAW, Cleveland, as its first sales representative for the company's new Banox rustproofing treatment of steel and galvanized steel.

D. D. LE FEVRE, with Cotan Corporation for nine years as sales manager, has been made a vice-president of the company, it was announced this month.

C. M. CROFT has been named manager of the Celanese Mexicana, S. A. plant now under construction at Ocotlan, near Guadalajara, Mexico. He expects to take up his new duties this summer.

NEWS *of* SUPPLIERS

Bird Machine Company, South Walpole, Mass., builders of Bird centrifugal filters, classifiers and suspended centrifugals, announces the election of F. K. Becker to the presidency of the company. Mr. Becker succeeds Phillips Dennett who retired April 1st after thirty-five years with the company.

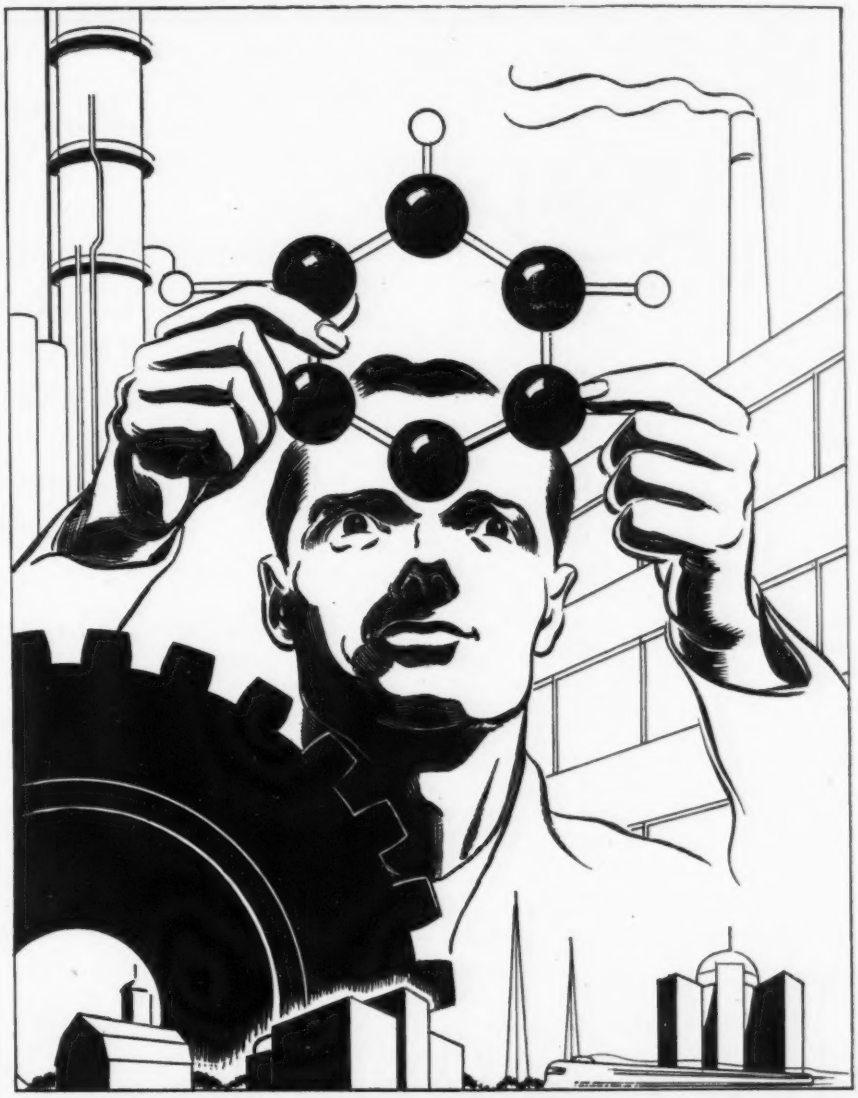
H. K. Porter Company, Inc., has announced completion of arrangements to sell the fixed assets of its freight car manufacturing plant at Mt. Vernon, Illinois, to Pressed Steel Car Company, Inc., of Pittsburgh. The sale was made in accordance with the Porter policy to further develop its railway specialties business inaugurated in December 1945 with the acquisition of Fort Pitt Spring Company, of McKees Rocks, Pa.

Consolidated net sales of **Fansteel Metallurgical Corporation,** North Chicago, Illinois, and its subsidiaries continued at a high level in 1945, exceeding $13,850,000, according to the company's annual report. Net earnings of the company and its wholly owned subsidiaries aggregated $520,511.79.

Link-Belt Co., in its annual report, lists 1945 sales as totalling $68 million, exclusive of its ordnance subsidiary, with net income noted as $3 million. In 1944 sales totalled $74 million, and net income amounted to $3.2 million.

Rheem Manufacturing Company, makers of steel shipping containers and basic household appliances, are establishing London offices in conjunction with the extension of operations within the British Empire, it is announced by W. E. Zander, vice president in charge of the company's foreign activities. Lanning Roper, recently returned from service with the U. S. Navy as lieutenant, will be in charge of the London office.

Denver Equipment Company has named T. S. Bailey, Jr., vice-president. He will supervise expansion programs of both the Denver Equipment Company and foreign manufacturing subsidiaries operating in Canada, Africa, Europe, Latin America and the Far East.



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Tariff Commission

(*Continued from page 800*)

tariff and trade agreements, foreign trade, economic conditions in foreign countries, foreign and domestic statistics, technical and economic problems of various industries and interrelated or competing commodities. In addition to this more than 600 current periodicals furnish up-to-date information on trade, technical, and economic subjects.

An outstanding collection on the tariff is the backbone of this library and in addition to this there is also excellent working material on raw products and manufactures in the fields of chemicals and drugs, textiles, minerals and metals, agricultural products, ceramics, lumber, paper, rubber, shoes and leather, synthetic products, and miscellaneous manufactures. This material is augmented by extensive files of foreign and domestic trade, technical and economic journals in bound form, a fairly complete file of current, as well as of scarce historical, legislative reference material dealing with the Commission's problems, and works on economics, law and accounting.

Supplementing comprehensive published bibliographies prepared by the library, bibliographical material is constantly collected on the tariff, reciprocal trade agreements, and raw material as well as on economic geography and other subjects currently in demand.

Though the collection is housed in crowded quarters, the character and scope of the research and statistical material are such as to bring to the library college professors as well as students, lawyers, industrialists, trade association representatives, scientists, and specialists from other government departments.

POSTWAR PROGRAM

Trade Agreements Program. In the immediate future, the Commission's efforts will be devoted primarily to the trade agreements program, which is of huge proportions, as the State Department has arranged to simultaneously negotiate trade agreements with the leading countries of the world—the United Kingdom, Canada, Australia, New Zealand, Union of South Africa, British India, France, Belgium, Netherlands, Czechoslovakia, Cuba, China, and Brazil.

The Commission is preparing digests of information on hundreds of products which may be considered, showing the competitive positions of domestic producers and the probable effects of tariff changes.

The War Changes in Industry series of reports, described elsewhere, will cover a total of 75 major industries, which have important problems of postwar competition from imported articles. About 15

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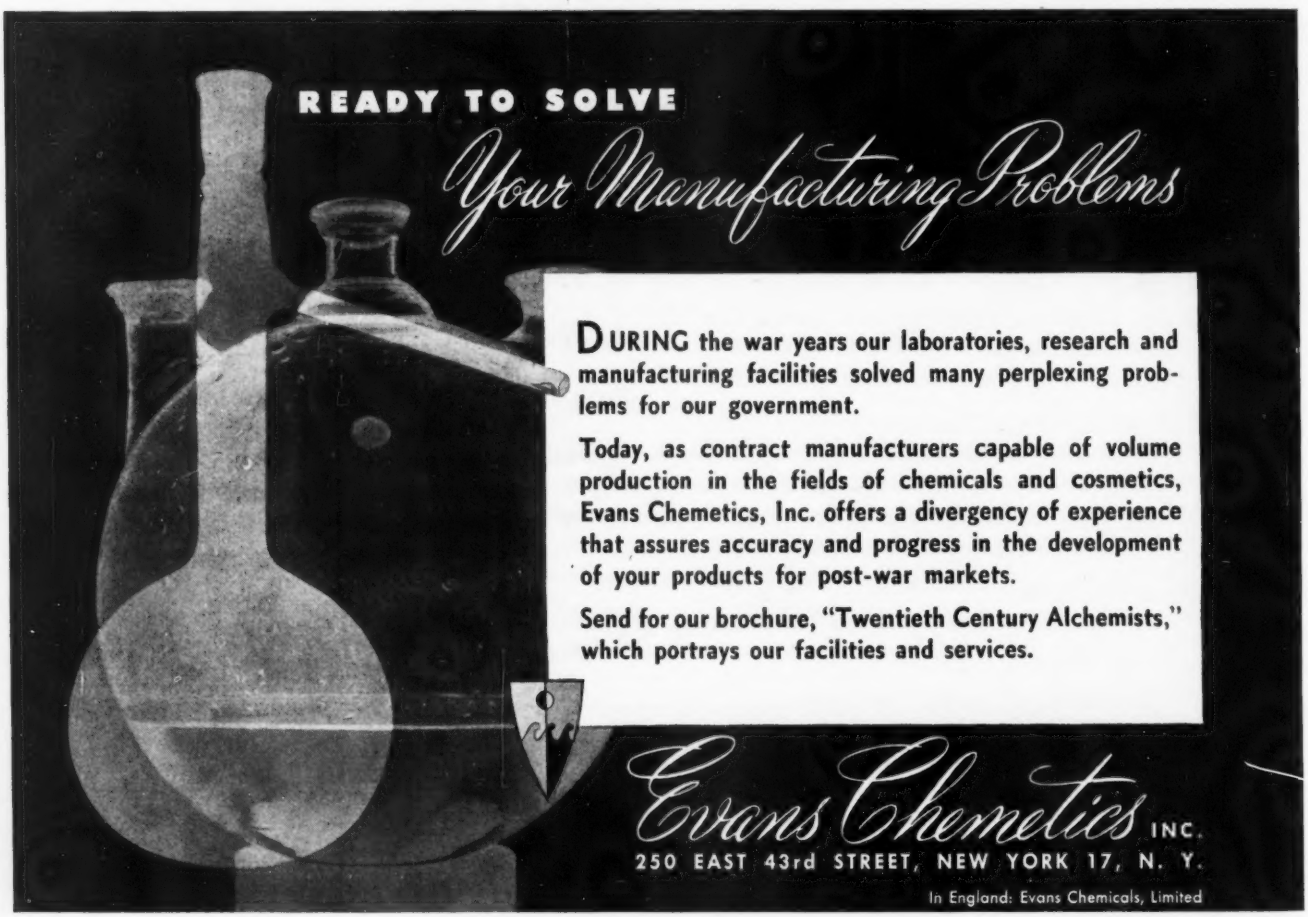
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of these comprehensive studies have been released and about 20 of the remaining 60 are in progress.

Effects of the War on the General Foreign Trade Position of the United States, a report requested by Congress, and now in progress, will consider the crucial problems of commercial policy which are facing the United States, including those resulting from the effects of the war on the economies of foreign countries.

International Trade Policies in Foreign Countries, an important series of reports also requested by Congress, will include studies of probable postwar conditions in the American republics. For some of these countries the Commission is also preparing reports on agricultural, pastoral, and forest industries; on mining and manufacturing industries; and on recent developments in foreign trade. Earlier, the Commission completed a series of reports on prewar commercial policy and trade in Greece, Rumania, Bulgaria, Yugoslavia, and Spain. A similar report on the trade and economy of the British Empire is in progress.

Chemicals and Allied Products will continue to occupy a prominent position among the Commission's regular and special reports.

The preliminary annual report on "Synthetic Organic Chemicals, United States Production and Sales," will be issued each year as soon after the close of the year as the return of the schedules by producers permits. This report will enable the chemical industry to make early use of the data in planning its activities. The elaborately detailed final report, which gives a list of manufacturers of each chemical produced in addition to the data contained in the preliminary report, will be issued as in the past as soon as possible.

In addition to the comprehensive annual reports of the Commission on organic chemicals, the issuance of monthly production data on a list of organic chemicals for index purposes will be continued. This index will provide statistics showing current trends in the industry.

The quantity of coal-tar chemicals imported under paragraphs 27 and 28 of the Tariff Act of 1930 declined during the war, but these imports will probably again become more important in postwar years. It is therefore planned to publish statistics on them at regular intervals in the future as in the past.

Before the war, import statistics on miscellaneous chemicals and medicinals entering the United States under the "basket" classification of paragraph 5 and of crude drugs under paragraph 1669 were issued annually. It is planned to continue this series in the postwar period.

Included in the War Changes in Industry Series, mentioned above, are reports on Dyes and Petroleum, which are in their final stages of preparation; Nitrates, and Fats and Oils, which are well advanced; Potash, Starches, and possibly other subjects.

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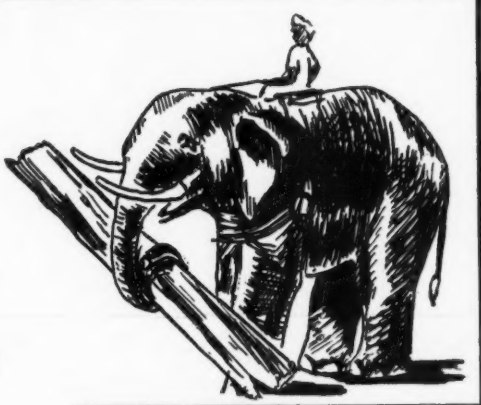

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Operations in 1946

(*Continued from page 775*)

panies reported net income of $211 million, which figure was practically unchanged from the $210 million net reported in the previous year and $198 million in 1939. Thus neither the substantial increase in assets or in sales was productive of greater net income. This was due almost entirely to tax rates.

The total of federal taxes paid in 1945 was $228 million, which was lower by approximately $100 million than the 1944 federal tax figure. The reason for this decline in tax liability despite the maintenance of sales volumes is due principally to important charge-offs of plant facilities by a number of companies under the accelerated amortization allowed by the federal government. Under a ruling announced late last year, companies having emergency facilities could charge off to earnings in 1945 the remaining unamortized amounts on their books rather than continue to amortize them over a five year period. Since most companies elected to make the full charge-offs in view of the large taxable income last year, the result was to reduce abnormally the amount of federal tax liability in 1945.

Another effect of this action is to understate to some degree the value of assets where facilities put up during the war remain in use but are on the books at nominal value. Taxable earnings arising from the use of these facilities after 1945 will be larger than they otherwise would be because there is no depreciation allowance that can be charged against such earnings.

As was the case during all the war years, common stockholders received less in dividends in 1945 than in 1939. The total amount paid out last year was approximately $150 million or slightly above the 1944 figure, but still $5 million under the $155 million of common dividends paid out in 1939 by the twenty-nine chemical companies. Of all the financial figures reviewed in this analysis, dividends on common stocks is the only item that shows a reduction since 1939.

Despite the uncertainties that prevailed in the first quarter of 1946, the indications are that earnings of chemical companies as a group will be larger than in the war years. Should these indications materialize, the achievement would be significant in view of the substantial increase in the burden of taxes now prevailing compared to taxes in prewar years. Specifically, the corporate income tax rate in 1939 was roughly 18 per cent. It is now 38 per cent, or 111 per cent greater. Thus future earnings prospects must be carefully related to the changed tax picture.

In the case of chemical companies generally, one appears justified in looking forward to better earnings prospects with considerably more confidence than would be safe for a number of other industries. There are at least two good reasons for this favored position. In the first place, there is a persistent long term growth in the demand for chemical products. The magnitude of this demand has certainly become greater as a result of the war in view of the many developments in new products, processes and techniques. Hence the industry is dependent not so much on deferments, but on the channeling into the productive processes for civilian markets of a wide range of products, old and new, that are continually finding expanding uses. Secondly, it appears that the chemical industry dealing with a wide and diversified list of products, has better control over its operations, particularly costs, than do many other basic industries. Therefore, it may not be nearly so vulnerable to the squeeze on profit margins.

As to the industry's earnings potential, the principal factor is taxes, especially when related to prewar volume of business and tax rates now prevailing. At the end of 1939 the twenty-nine chemical companies had a total net worth of $1.67 billion on which they earned 14.1 per cent before taxes and 11.9 per cent after taxes. Federal taxes, therefore, amounted to 2.2 per cent of net worth. At the end of 1945, net worth of these same companies was up to $2 billion. On this they earned in that year 21 per cent before taxes and 10.1 per cent after federal taxes. During the war years the problem of chemical companies was what volume of earnings would they retain rather than how much could they earn.

Since it is expected that eventually volume of sales will exceed the peak war volume, the question of earnings after taxes is a pertinent one. As a rough calculation, it can be estimated that chemical companies must do about one-third greater volume of business than the best prewar year in order to retain the same amount of earnings under the higher corporate tax rates now prevailing.

A rough indication of the earnings potential is attempted in Table III. In this calculation the present corporate tax rate is applied to 1945 earnings before taxes. The resulting net income is $272 million, or about $75 million greater than in 1939. This calculation has two shortcomings as far as its usefulness as a guide to future prospects is concerned. One is that the peak in war volume may not be immediately reached. The other is that the 1945 net income figure was affected by non-recurring charge-offs mentioned above. But in any case, whether or not earnings after taxes exceed the war year figures, the investor seems to be optimistic enough to bet that they will or can or should. Over the longer term the indications are that he is on safer ground than if his stake were in any of a host of other industries.

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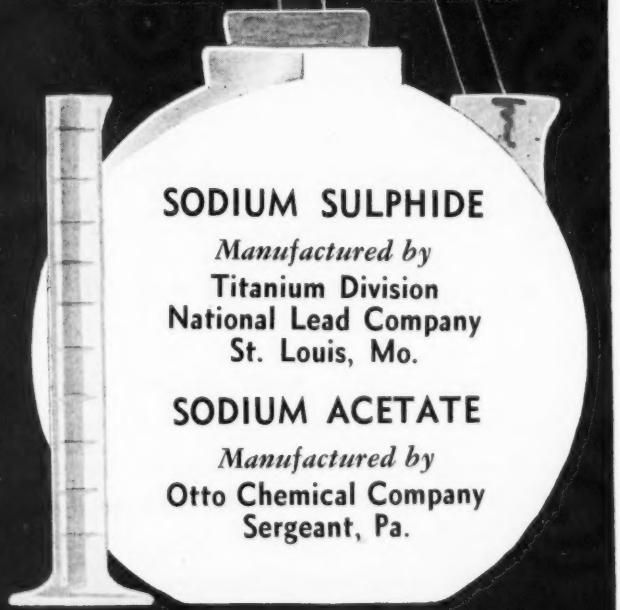

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(*Continued from page 806*)

in the ideas advanced by the Commission. Also, it is apparent, there are several Congressional committees that will lose no time in bringing out suitable bills in line with the suggestions noted here, and perhaps carrying them further than was contemplated by the Commission.

In any case, the Commission points out that if Congress takes such action eventually, "It will be all the more incumbent on the Government, assuming it desires to promote competition in the aluminum industry, to seek means of assuring that adequate supplies of foreign bauxite, or alumina, would be available to independent aluminum producers."

Foreign Bauxite Deposits

There are numerous foreign sources of bauxite, total world reserves being tentatively placed at more than 1 billion tons. Reserves are located in various parts of the British Empire, and a special committee of the War Production Board recently placed roughly one-fourth of the total known reserves in this hemisphere—Jamaica, British and Dutch Guiana, and Brazil principally, although the United States is credited with 35,000,000 tons.

Europe is believed to hold something over a fourth of the total, with Hungary ranking at the top, and France with large deposits. The Soviet Union, not included in the European estimate, is believed to have about 26,000,000 tons. It is an interesting sidelight perhaps, to note that Russian influence dominates Hungary, with its high reserve total, and impinges hard on China, which ranks with Hungary in its proportion of the world total.

Another fourth is believed to be in Africa, including French West, the Gold Coast, and Nyasaland. A fifth of the total is attributed to China, the Netherlands East Indies, Australia and India.

The Commission says it is possible, but unlikely, that large domestic deposits of bauxite may be found which are suitable under present technology for aluminum production. Also, the Commission points out, it may be that in time domestic deposits of aluminum bearing materials other than bauxite, which are known to be abundant, may become economically practical as a result of advances in technology.

In the absence of such developments, however, the Commission finds that "much the greater part of the aluminum consumed in the United States will, within a decade or so, be derived from foreign bauxite." Domestic production in any case, the Commission says, seems unlikely to be much above prewar levels, and if the Government adopts a rigid conservation policy, production might be materially less from this source.

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Wider Application of 2,4-D Foreseen

Greenhouse tests carried on for the past 2 years indicate the possibility that weed seeds can be killed out in the surface soil of fields during the winter by applying small quantities of 2,4-D in the fall, leaving the soil ready for planting in the spring relatively free of weeds and also free of the killing chemical, the U. S. Department of Agriculture states.

The carryover effect on crops following the spraying of weeds with 2,4-D has prevented germination of some crops planted soon after the spraying, according to specialists of the Department's Agricultural Research Administration. This undesirable result has led to experiments at the Plant Industry Station, Beltsville, Md., that indicate this soil effect may be turned to good account in the control of weeds before they come up.

As low a concentration of 2,4-D as 1 part in 4½ million parts of moist soil, in the greenhouse, has been enough to prevent or seriously retard the germination of seeds of sensitive plants. This amounts to about 1½ ounces in the upper inch of an acre of soil, much less than the 1½ pounds per acre ordinarily used to kill weeds by spraying the foliage. In the tests barley, a very resistant plant, and mustard, a very sensitive one, were used.

The apparent success of these recent experiments hinges on the fact, say the experimenters, that the herbicidal power of 2,4-D is not lasting in moist soil. On the other hand, when soil is very dry the chemical may retain its power to kill sensitive seeds for a year or even a year and a half.

The investigators feel from results so far obtained that what at first seemed a bad obstacle to wide usefulness of this weed killer—the sensitivity of many important crops—may fade away. However, because of such factors as the variation in the sensitivity of weed seeds and the bringing up of unaffected seeds during plowing and crop planting, the Department feels that definite advice on the farm use of the new facts can not be given yet.

Government Approved DDT Uses

New recommendations for use of DDT have been made by the United States Department of Agriculture for the 1946 crop year. The main point to be considered is that DDT should not be applied in such a way that it will contaminate foodstuffs.

The Bureau of Entomology and Plant Quarantine has not as yet approved the general use of DDT except in the instances given below:

Household insects: Flies, mosquitoes, fleas, roaches, bedbugs, lice, ants, ticks and other house and barn insects; dusts of 10 per cent DDT in talc or pyrophyllite; solutions of 5 per cent DDT in kerosene or fuel oil; and emulsions of 2½ per cent DDT dispersible powders in water. Oil solutions should not be applied to animals.

Insect pests of forest and shade trees: For defoliating insects: emulsion, one pound DDT, one quart solvent (xylene) and one or 1½ ounces of an emulsifying agent. For dilution to a 0.1 per cent emulsion add 100 gallons of water and apply with sprayer.

Despite extensive investigations, it is not practicable to recommend the use of DDT on fruits, the bureau said.

Insects affecting cereal and forage crops: For stored seed insects: Dust of 3 per cent DDT in pyrophyllite thoroughly mixed with the seed, one-half ounce of dust to one bushel of seed, or, 3 per cent DDT in magnesium oxide which is also a repellent, applied in the same manner. Not recommended for stored grains or cereal products to be used for food.

For insects affecting stored grains and cereal products in grain bins, warehouses, and mills: Sprays containing 5 per cent or less of DDT in refined, deodorized kerosene or in water suspensions or emulsions applied to the walls and woodwork at a rate of not more than one gallon of spray per 100 square feet. Avoid contamination of grains or food products.

New Series of Synthetic Waxes

Plans are under way for the construction of a plant to manufacture a unique series of synthesized waxes, collectively known under the tradename Abril, at Bridgend, South Wales.

The new waxes are said to be more uniform than many natural products, and have various melting points extending up to 250 Cent. A major use suggested for the higher melting point types is as addition agents for paraffin compositions.

An initial production target of 1250 tons has been set up for this year, with 2500 tons scheduled for 1947, and 10,000 to 15,000 tons for 1948. Primary attention is at present being devoted to export markets.

New Adhesives Laboratory Founded

Establishment of the Dayton Chemical Products Laboratories is announced by Stewart L. Brams, former supervisor of

Develop New Fungicide for Textile Treatment

Based on copper 8-quinolinolate, which was first prepared in Germany 66 years ago, the above researchers formulated what is said to be a long-lasting textile preservative. They are, left to right, P. G. Benignus, Ira Hatfield, and David Rogers, of Monsanto. Mr. Hatfield is holding an untreated fabric sample that decayed in 7 days, while Mr. Rogers examines a treated companion swatch which resisted a 90 day burial test. The product will be marketed to textile mills only.

the cement laboratory of the General Motors Inland Mfg. Division, Dayton, Ohio. The office for the new concern will be located at 1150 W. Second St. in Dayton.

The new laboratories will do consulting, research and development in all fields of applied chemistry, with particular emphasis on problems involving rubber adhesives, the bonding of rubber to metal and other materials, and adhesives and adhesion problems in general.

Hiler Joins Stepan Chemical

Malvern J. Hiler, formerly Chicago district manager of Sharples Chemicals, has joined Stepan Chemical Co., Chicago, as director of research and chemical development. His main duties will be the organization of research facilities for sulfonated oils and chemical specialty compounding.

New Felt Washing Compound

The Cowles Detergent Co., Cleveland, is now marketing an anhydrous paper mill felt washing detergent under the tradename Nu-Nap.

It is packaged in two grades, for on and off machine washing, to meet varying mill operating conditions.

Kellogg Chemical Expands

Kellogg Chemical Co., Detroit, has recently acquired additional facilities to more than double plant capacity, and to provide larger office and warehousing quarters.

According to Henry Strub, manager, the company plans to increase substantially its output of insecticides, polishes, soaps, cleaners, and deodorant sprays.

Adhesives Products Extends Facilities

Adhesives Products Corp., Bronx, N. Y., has begun construction of a 20,000 foot addition to its productive facilities which will be utilized for the manufacture of a more diversified line of rubber chemicals.

For the past fifty years the company has specialized in the preparation of rubber based adhesives, emulsions, and coating compounds, and more recently has made a wide range of similar synthetic-rubber based products, and some chemicals for rubber compounding. The new extension will be devoted, in the main, to an expansion of the latter activities.

National Oil Expands

National Oil Products Co. is planning the construction of a $150,000 plant addition to its Flemington, N. J., facilities.

The company plans to utilize the extension for increased output of its Admiracion shampoos.

DDT Soap Formulation Suggested

Several British research workers have recently incorporated DDT in ordinary household soap and claim that the product thus obtained is particularly useful as a dog soap.

Used for washing twelve dogs, all of the long-haired breeds, and infected with either fleas or dog lice, they found that the soap killed all vermin, and prevented re-infestation. Apparently the insecticide was effective in concentrations as low as five one hundredths of one per cent.

One company has applied for a British patent on the use of DDT in such soap compounds.

Extend Paint Line

National Lead Co. plans to introduce a line of exterior mixed paints in tints and trim colors to be sold under its Dutch Boy trademark.

EDWAL

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Ammonium Thiosulphate
(photographic fixing agent, silver brightener)

Methyl and Ethyl Iodides
(synthesis)

o-Phenylene Diamine
(photographic developer, intermediate)

Sodium Cyanate
(synthesis, heat treating metals)

Write for Edwal price list No. 10-0 listing over 80 chemicals

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CANADIAN NEWS

Evaluate Seaweed As Raw Material

Reports from Canada's Pacific coast reveal that considerable interest has been aroused recently in the potential exploitation of British Columbia seaweed, with three corporations considering development programs.

One organization, B. B. Marine Laboratories Ltd., is completing construction of a processing unit near Vancouver, and plans another on Deer Island, to utilize the seaweed for the manufacture of mineral salt tablets for human and livestock consumption. Their interest centers on the nereocystis and macrocystis type of kelp.

Too, a Chicago firm, specializing in the production of agar, is investigating graciliria, a variety of seaweed containng a fairly high agar content.

The third organization, a British corporation, is interested in the seaweed as a possible source of alginic acid as a raw material for synthetic textiles.

C. I. L. Sales Increase

Sales of Canadian Industries Ltd. (I. C. I.-du Pont) increased slightly in 1945 over the previous year, in spite of the decline in the Dominion's industrial output, according to George W. Huggett, president. Too, during the year fixed operating investment rose $1,277,000, and capital expenditures totalling $4,980,000 were authorized.

Earnings, continuing the trend begun in the preceding year, showed a further improvement in 1945, although profits were still well below the average for the last four prewar wears. Net income, at $4,929,000, was 8 per cent higher, while net earnings were equivalent to $6.58 per common share as compared with $6.04 in 1944, $5.88 in 1943, $6.12 in 1942, and $7.22 in 1941.

Dividends on the common stock were increased to $5.50 for the year as compared with $5.25 in 1944 and 1943, $5.75 in 1942 and $6.25 in 1941.

Copper Sulfate Unit Meets Domestic Needs

One of the more important additions to Canada's chemical industry is the copper sulfate unit completed recently by Canadian Copper Refiners Ltd., Montreal. Operated as a subsidiary of Noranda Mines—huge northern Quebec copper-gold producer—the plant is currently turning out over 400 tons monthly of sulfates.

Hitherto, with no domestic production, the Dominion has been dependent on imported sulfate, with the highest percentage of shipments originating in Great Britain, and lesser quantities coming in from the U. S. A. Now, however, it is estimated that the Montreal facilities will be geared to completely accommodate Dominion needs, and also may engage in some export trade with the U. S. A.

Air View Shows Shawinigan Wartime Expansion

Courtesy C. P. Airlines

The above aerial view of Shawinigan Chemicals' production facilities shows for the first time the extensive additions which have been made during the past few years. The calcium carbide plant, with rated capacity of over 200,000 tons per annum, can be seen in the background, with the newer acetic anhydride, polyvinyl chloride, butanol, and other acetylene based chemical units in the foreground. Such diversification has advanced Shawinigan from a carbide furnacer to a $20 million per annum chemical producer.

Atomic Energy Investment Revealed

Canada's investment in atomic energy research and development, long held secret, was listed as amounting to $27 million by Reconstruction Minister Howe recently.

At present, the Dominion's existing atomic energy facilities include the Chalk River, Ont., plutonium-heavy water unit, a heavy water project in western Canada, and the Eldorado uranium mines and refinery. Prime emphasis has been placed on uranium-based processes, but some attention has also been devoted to thorium.

WAC Sells Penicillin Unit To Ayerst

One of Canada's first penicillin producing plants, financed by the government, and operated by Ayerst, McKenna and Harrison Ltd. (American Home Products) for the past two years, has been sold by War Assets to the operators for $200,000. The sale figure, according to WAC, represents a recovery of 28.1 per cent on original investment. Completion of the transaction places Ayerst and Merck as the two dominant, privately-financed penicillin producers.

New Western Plant For Dalglish

Dalglish Chemicals Ltd., purchased several months ago by burgeoning Standard Chemical Co. Ltd., is entering the western Canadian market with the establishment of a plant at Vancouver. Simultaneously, it is drafting plans for sales coverage of Manitoba and Saskatchewan.

Dalglish, with plants in Montreal and Toronto, manufactures and distributes alkaline cleaners and other chemicals used by the laundry, dry-cleaning, and dairy industries, as well as packaging Javex bleach for retail distribution.

Nichols Builds

Nichols Chemical Co. Ltd., Montreal, has recently awarded a $500,000 contract to the Foundation Co. for the construction of a new plant at Valleyfield, P. Q.

Located adjacent to its sulfuric acid project, it is reported that aluminum sulfate will be a major product.

Chemical Convention

Hotel accommodation for the convention to be held in Toronto, June 24-26, may be arranged through the Conference Committee, P. O. Box 96, Terminal A, Toronto. Although most hotels are not accepting direct reservations they will honor applications made through the Committee.

Pyroxylin Fabrics Register Marked Gain

A total of 6.8 million pounds of pyroxylin was spread during January, 1946, an increase of 12 per cent over the 6.0 million pounds spread in December, 1945, according to a report released by the Bureau of the Census.

Shipments of 8.3 million yards of pyroxylin coated fabrics during January, 1946, show an increase of 22 per cent over the 6.9 million yards shipped in December. Unfilled orders on hand at the end of January, 1946, for pyroxylin coated fabrics amounted to 12.8 million yards, which were 7 per cent greater than the 11.9 million yards on order at the end of December, 1945. A decrease in the quantity of unfilled orders for "Custom coating" was more than offset by increases in both "Heavy" and "Light" cotton fabric classifications.

These statistics are based on reports received from 29 companies which have been reporting since August, 1945. The figures are not strictly comparable with those published prior to August, due to inclusion of reports from establishments not previously canvassed. Comparison of data from 21 companies reporting prior to August, 1945, show that these companies spread 6.4 million pounds of pyroxylin during January, 1946, an increase of 12 per cent over the 5.7 million pounds spread in December, 1945, and 34 per cent greater than the 4.8 million pounds spread in January, 1945.

The same companies report shipments of 7.2 million yards in January, 1946, as compared to 5.7 million yards in December, 1945. The 10.6 million yards on order at the end of January represents a decrease of less than 1 per cent from the orders on hand at the end of December, 1945.

The statistics in the summary represent operations of processors who coat or impregnate fabrics or paper with soluble cotton or pyroxylin preparations, either separately or in combination with other materials. "Light" cotton fabrics include sheetings and print cloths; "Heavy" cotton fabrics include drills, ducks, sateens, broken twills, and moleskins.

WPB Charts Penicillin Output

Commercial production of penicillin was begun early in 1943 and expanded rapidly. Beginning with an estimated average monthly output of 0.08 billion Oxford units in the first 5 months of 1943, production reached more than 600 billion Oxford units per month in the middle of 1945. Producers' stocks were reported for the first time in March, 1944, when they amounted to 2.5 billion units. These stocks increased irregularly thereafter.

Output during the past few years is totaled as follows by the WPB:

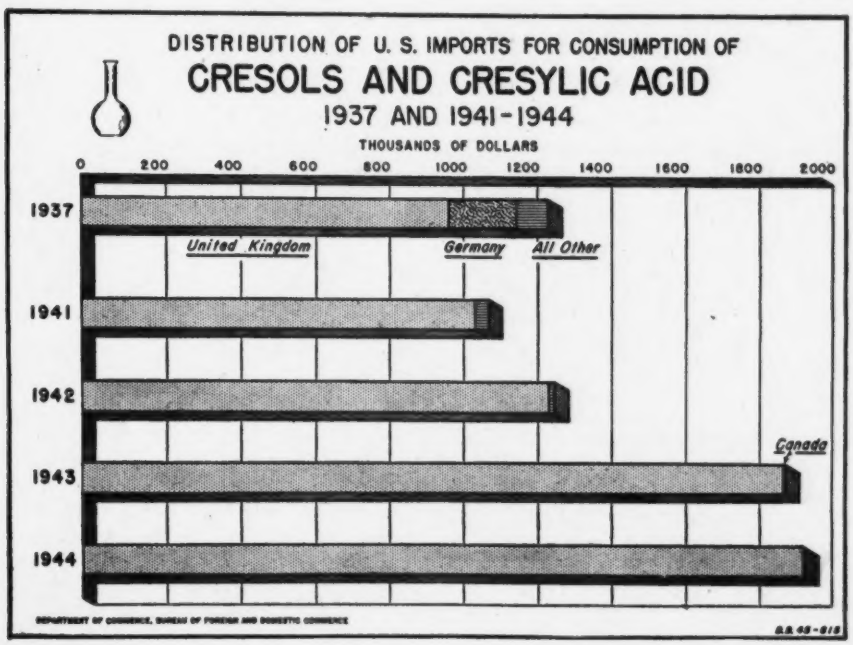
1943— 21,192 million Oxford units
1944—1,633,385 million Oxford units
1945—7,052,377 million Oxford units

The distribution of penicillin was placed under strict control by the War Production Board in July, 1943, and each month thereafter allocations of the supply of the new drug were made to various claimant agencies. In 1943 and 1944, approximately 80 per cent of the output went to the military services. Decreased military requirements and increased production permitted a large rise in the quantity of penicillin made available for civilian purposes in 1945. In the first 7 months of 1945, approximately 40 per cent of output, or 1,466 billion Oxford units, was distributed for civilian uses. Commercial exports of penicillin did not begin until the middle of 1944; these, too, were expanded in 1945, reaching 200 billion units in July, 1945.

Streptomycin Output Up Slightly

Streptomycin availability for April is estimated at about 29,900 grams, compared with about 27,260 grams in March, according to the Civilian Production Administration. This production rate is not yet on a commercial scale and is far too low to meet military requirements.

Distribution of streptomycin in grams for April is as follows:—Military, 15,935 grams; other government agencies, 4,500 grams; research and civilian, 9,465 grams.



PLASTIC WATER PAINTS, COLD WATER PAINTS, AND CALCIMINES

December 1945 and Annual Summary

The statistics presented in the following table are based on data reported by 38 identical manufacturers who accounted for approximately 87 percent of the total value of plastic texture paints, cold-water paints and calcimines in the United States, as reported in the Biennial Census of Manufactures, 1939.

For an explanation of certain changes which affect previously published data, see "Facts for Industry," Series M19K-85, released November 12, 1945.

Product	*December*	*November*[1]
Plastic-texture Water Paints, Total:[2]		
Pounds	1,029,871	1,021,383
Value	$69,702	$67,691
Cold Water Paints, Total		
Value	$382,291	$471,666
Interior, total value	$251,515	$268,777
Casein and other protein bound:		
Paste and semipaste form—		
Gallons	148,588	153,389
Value	$186,307	$200,491
Dry powder form—		
Pounds	735,481	749,502
Value	$56,742	$58,443
Glue bound—		
Pounds	174,902	224,406
Value	$8,466	$9,843
Exterior, total value	$130,776	$202,889
Casein and other protein bound:		
Pounds	261,703	301,780
Value	$18,922	$19,463
Lime and/or cement bound—		
Pounds	1,460,715	2,389,541
Value	$111,854	$183,426
Calcimines, Total:		
Pounds	1,759,032	1,931,417
Value	$85,530	$90,695
Hot water—		
Pounds	658,789	829,947
Value	$29,151	$37,450
Cold-water—		
Pounds	1,100,243	1,101,470
Value	$56,379	$53,245

[1] Revised.

[2] Includes paste and dry powder plastic-texture water paints which cannot be shown separately without disclosing operations of individual companies.

German Chlorine Data

Startling as was the increase in German chlorine production (70 per cent from '40 to '44), it does not equal the increase in U. S. production, which exceeded 100 per cent over this same period. At its peak the German production of chlorine totaled less than 40 per cent of our peak production.

During the last three years of the war large expansions were under way in many of the German chlorine plants, but intensification of Allied bombings and shortages of construction materials prevented the realization of further expanded production.

In 1943 German chlorine production was utilized about as follows:

Use	*Per cent*
Ethylene chlorohydrin for ethylene oxide	33
Various plastics, of which PVC was the largest	13
Hydrogen chloride	9
Magnesium	7
Sold as liquid chlorine	6
Chlorination of acetylene	5
Methylene chloride	4
Other chlorinated solvents	4
Carbon tetrachloride	3

The outstanding use of chlorine was for the production of ethylene oxide via acetylene to ethylene to ethylene chlorohydrin to ethylene oxide or ethylene glycol. This was used as a motor coolant and as a raw material for explosives. Ethylene oxide was also used extensively as an intermediate for detergents. There seems to have been little or no counterpart of the tremendous U. S. acetylene chlorination development of trichlorethylene for metal degreasing.

Zinc Production For February

Despite unsettled labor conditions, particularly at the mines in Tennessee and Utah, the average daily rate of zinc output from domestic mines increased slightly in February, according to the Bureau of Mines, United States Department of the Interior. The February production of 48,137 short tons was, however, 6 per cent below the monthly average during 1945 and 20 per cent under the 1944 monthly average.

Zinc production in the Eastern States decreased 2,199 tons due largely to a labor strike called for February 2 at the mines of the American Zinc Co. of Tennessee in Knox and Jefferson Counties, Tennessee. The daily rate of zinc production in the Central States continued to increase in February but the net production for the month was less due to a shorter operating period. The new Park Walton 700-ton mill eight miles west of Picher, Oklahoma, began operating in February.

In the Western States declines in daily outputs in California, Montana, and Utah were more than offset by gains in daily production rates in the other producing States. Labor strikes at smelters in the Western States did not noticeably affect mine production in February as most of the large producers continued to operate and stock pile concentrates. Lack of output from the United States Smelting, Refining & Mining Co. property at Bingham, Utah, strike-bound since January 21, was largely the reason for a decrease of 650 tons (28 per cent) in the Utah zinc production. Zinc output in Arizona continued to gain in February. In New Mexico the daily rate of production increased to the highest level since June, 1945. On February 25 the American Smelting & Refining Co. mining and milling operations in Grant County, New Mexico, and Santa Cruz County, Arizona,

CHEMICALS
UNITED STATES PRODUCTION, FEBRUARY 1946

Statistics on the production of chemicals shown in the following table are a continuation of the series initiated on February 7, 1944, in "Facts for Industry," Series 6-1-1. With the end of the war, the list of chemicals covered was reviewed and those presented here were selected for continuation. While considerably curtailed, this group of chemicals and gases is fairly representative of the products of the inorganic chemicals industry, and provides sufficient information for gaging the broad changes in operations from month to month. This list is subject to change if future developments indicate that additional chemicals should be covered or that certain of those on which data are now published have relatively small interest. The figures shown here represent the primary production of the various chemicals in the United States, including quantities produced for consumption in the producing plant, produced for intra-company transfer and produced for sale. Data on consumption and stocks in producing plants, included in this release through September 1944, are no longer collected.

Chemical and Basis	*Unit*	*Production* — *February (Preliminary)*	*Production* — *January (Revised)*
Ammonia, synthetic anhydrous[1]	Short tons	39,738	*41,384
Ammonium nitrate (100% NH_4NO_3)	Short tons	38,543	37,695
Ammonium sulfate, synthetic (technical)	M pounds	17,855	17,996
Calcium arsenate (100% $Ca_3(AsO_4)_2$)	M pounds	1,104	952
Calcium carbide (commercial)	Short tons	40,316	45,192
Calcium phosphate:			
Monobasic (100% $CaH_4(PO_4)_2$)	M pounds	6,332	5,569
Dibasic (100% $CaHPO_4$)	M pounds	8,083	7,750
Carbon Dioxide:			
Liquid and gas	M pounds	15,630	*17,767
Solid (dry ice)	M pounds	38,539	*38,311
Chlorine	Short tons	84,798	*89,707
Chrome green (C. P.)	M pounds	[2]	1,748
Chrome yellow and orange (C. P.)	M pounds	[3]4,140	4,617
Copper acetoarsenite (Paris green)	M pounds	[4]	[4]
Hydrochloric acid (100% HCl)	Short tons	26,837	*26,822
Hydrofluoric acid:			
Anhydrous (100% H_2F_2)	M pounds	3,063	2,204
Technical (100% H_2F_2)	M pounds		
Hydrogen	Millions of cubic feet	1,307	*1,426
Lead arsenate (acid and basic)	M pounds	7,567	*6,421
Methanol (natural) (100% CH_3OH)	M gallons	185	211
Molybdate chrome orange (C. P.)	M pounds	[2]	464
Nitric acid (100% HNO_3)	Short tons	31,121	34,769
Oxygen	M cu. ft.	605,693	*715,743
Phosphoric acid (50% H_3PO_4)	Short tons	69,728	*68,452
Silica gel:			
Desiccant grade	M pounds	3,171	4,059
Aviation gas catalyst grade	M pounds		
Silver nitrate (100% $AgNO_3$)	M ounces	3,442	4,152
Soda ash (commercial sodium carbonate):			
Ammonia soda process—			
Total wet and dry (98-100% Na_2CO_3)[5]	Short tons	342,625	387,012
Finished light (98-100% Na_2CO_3)[6]	Short tons	168,213	196,492
Finished dense (98-100% Na_2CO_3)	Short tons	123,046	132,339
Natural[7, 8]	Short tons	16,548	17,645
Sodium bicarbonate (refined) (100% $NaHCO_3$)	Short tons	13,809	15,132
Sodium bicarbonate and chromate	Short tons	7,134	7,735
Sodium hydroxide (caustic soda):[9]			
Electrolytic process—			
Liquid (100% NaOH)	Short tons	81,499	*85,922
Solid (100% NaOH)	Short tons	14,713	17,757
Lime-soda process—			
Liquid (100% NaOH)	Short tons	61,646	68,427
Solid (100% NaOH)	Short tons	17,861	21,618
Sodium phosphate:			
Monobasic (100% NaH_2PO_4)	Short tons	1,116	1,244
Dibasic (100% Na_2HPO_4)	Short tons	5,262	5,727
Tribasic (100% Na_3PO_4)	Short tons	8,429	9,216
Meta (100% $NaPO_3$)	Short tons	2,647	2,272
Tetra (100% $Na_4P_2O_7$)	Short tons	5,125	4,343
Sodium silicate:			
Soluble silicate glass, liquid and solid (anhydrous)	Short tons	[3]32,851	34,524
Sodium sulfate:			
Anhydrous (refined) (100% Na_2SO_4)	Short tons	7,001	7,864
Glauber's salt (100% $Na_2SO_4.10H_2O$)	Short tons	12,775	13,215
Salt cake (crude) (commercial)[7]	Short tons	43,061	40,360
Sulfuric acid:			
Total (100% H_2SO_4)	Short tons	666,177	*743,904
Chamber process (100% H_2SO_4)	Short tons	[10]235,867	[10]*256,137
Contact process (100% H_2SO_4)[11]	Short tons	[12]430,310	[12]*487,767
Net, contact process (100% H_2SO_4)[11, 13]	Short tons	[12]389,117	[12]*443,320
Zinc yellow (zinc chromate (C. P.)	Short tons	[3]	[4]

[1] Data for a small amount of aqua ammonia are included in the figures reported by one company.
[2] Not yet available.
[3] Proportion of estimate, 10 percent.
[4] Data cannot be published without disclosing operations of individual establishments.
[5] Total wet and dry production, including quantities diverted for manufacture of caustic soda and sodium bicarbonate, and quantities processed to finished light and finished dense soda ash. For detailed discussion of soda ash statistics, see "Facts for Industry," Series 6-1-1.
[6] Not including quantities converted to finished dense soda ash.
[7] Natural soda ash and crude salt cake data collected in co-operation with Bureau of Mines.
[8] Data for a small amount of trona are included in the figures reported by one company.
[9] Production figures represent total production of liquid material, including quantities evaporated to solid caustic and reported as such.
[10] Proportion of estimate, 7 percent.
[11] Includes sulfuric acid of oleum grade.
[12] Proportion of estimate, 2.5 percent or less.
[13] Excludes spent acid. For detailed explanation see "Facts for Industry," Series 6-1-1.
* Revised.

Prepared in the Industry Division by the Chemicals Unit.

were closed by labor strikes. Colorado zinc output returned to the 1945 monthly level as two large producers in the Leadville area resumed operations following a shutdown since December due to smelter strikes.

Mine production of recoverable zinc in the United States, (monthly and monthly averaged as indicated) in 1944, 1945, and January—February 1946, in short tons.

Region and State	1944 (monthly average)	1945 (monthly average)	1946 Jan.[1]	1946 Feb.
Eastern States	14,694	13,004	13,465	11,266
Central States	17,912	13,650	14,694	13,756
Western States				
Arizona	2,423	3,194	4,000	3,900
California	705	777	760	600
Colorado	3,330	2,982	2,963	2,942
Idaho	7,614	6,449	6,500	6,250
Montana	[2]3,011	[2]2,529	[2]2,750	1,800
Nevada	1,725	1,646	1,850	2,000
New Mexico	4,227	3,246	2,783	3,033
Utah	3,249	2,564	2,350	1,700
Washington	992	959	880	890
	27,276	24,346	24,836	23,115
Total United States	59,882	51,000	52,995	48,137

[1] Revised figures.
[2] Includes some zinc contained in foreign material treated in Montana.

Employment in Fertilizer Industry Up

Employment in fertilizer plants continues to increase, in marked contrast to the decline in over-all manufacturing employment. The number of wage workers in the fertilizer industry in January, according to reports of the U. S. Bureau of Labor statistics was 6 per cent greater than a year earlier, compared with a 24 per cent decline in employment in all manufacturing industries. Reversing a trend which had lasted during the war period, employment in fertilizer plants in the last year showed a greater increase than did payrolls. This reflects a reduction in the hours worked, as average hourly earnings have increased. Comparative figures for the fertilizer industry are given below.

	Jan. '46	Jan. '45
Number of wage earners	24,400	23,100
Employment index (1939=100)	130.2	122.9
Payroll index (1939=100)	280.7	269.1

Native Sulfur in February

Production again exceeded mine shipments in February, continuing a trend begun in September 1945, according to reports of producers to the Bureau of Mines, United States Department of the Interior. Producers' stocks continued relatively high.

Production, mine shipments, apparent sales, and producers' stocks of native sulfur in the United States in selected periods, 1945-46, in long tons.

Period	Production	Apparent Sales*
February 1946	286,316	283,491
January 1946	318,722	262,178
February 1945	260,677	298,698
January 1945	275,722	341,589
Monthly average 1945	312,766	320,799

*Calculated from production and change in stocks during the period.

United Kingdom Naval Stores Purchases

In view of the prospective effects of an approved British loan, considerable attention is being given to a tabulation prepared by the Forestry Bureau appraising the status of the United Kingdom as a market for naval stores producers. Actually, since 1923 Great Britain has been the best single foreign customer of naval stores producers, for both turpentine and rosin.

The figures for turpentine showed wide fluctuations prior to 1940, with the turpentine exports to Britain in 1940 approaching the previous high established in 1926. In 1926, with a production of 580,000 barrels, an over-all export total of 256,000 barrels was attained. Of this export total, 145,000 barrels went to the United Kingdom—representing 56.6 per cent of all exports. In 1940, the last year for which normal dependable figures are available, the total production was 566,000 barrels, of which only 131,000 barrels were

FATS AND OILS

(In thousands of pounds)

Item	Factory Production Feb. 1946	Factory Production Jan. 1946	Factory Consumption Feb. 1946	Factory Consumption Jan. 1946
Vegetable Oils				
Cottonseed, crude	88,893	143,349	121,854	124,257
Cottonseed, refined	109,495	112,067	84,568	84,004
Peanut, crude[1]	7,323	13,591	12,739	14,885
Peanut, refined	11,461	13,124	7,836	7,492
Coconut, crude	12,016	11,430	14,243	12,919
Coconut, refined	5,043	4,689	4,804	5,323
Corn, crude	10,066	12,794	9,855	13,080
Corn, refined	9,074	11,741	2,055	3,866
Soybean, crude	135,103	143,436	130,777	122,709
Soybean, refined	121,887	112,617	86,023	90,770
Olive, edible	792	862	11	15
Olive, inedible	—	—	14	23
Olive, sulphur oil or olive foots	[2]	—	60	117
Palm kernel, crude	—	—	4,834	3,520
Palm kernel, refined	[2]	[2]	[2]	[2]
Palm, crude	—	—	3,166	4,480
Palm, refined	[2]	[2]	293	773
Babassu, crude	[2]	[2]	5,043	5,543
Babassu, refined	[2]	[2]	2,624	2,128
Rapeseed	—	—	1,427	1,057
Linseed	45,749	56,016	43,054	44,257
China wood or tung	1,397	1,086	1,655	1,493
Perilla	—	—	14	7
Castor No. 1, crude	9,049	9,535	6,371	6,052
Castor No. 3, crude	2,565	2,599	2,234	2,509
Castor, dehydrated	2,684	2,882	2,410	2,720
Castor, sulphonated	...	...	457	533
Sesame	—	—	3	7
Oiticica	—	—	1,413	1,542
All other	10,297	9,629	3,758	7,038
Animal Fats				
Lard, rendered, including neutral lard and rendered pork fat	188,168	142,369	4,163	2,912
Tallow, edible	8,621	5,939	6,316	5,978
Tallow, inedible	94,155	88,433	106,289	102,927
Neat's-foot oil	207	138	365	256
Fish and Marine Mammal Oils[3]				
Cod	18	49	1,298	1,087
Cod liver	4	8	977	897
Other liver	245	404	536	968
Other fish	[4]636	[5]3,257	11,964	15,692
Marine mammal			1,297	849
Greases				
Greases (including garbage and house), other than wool	51,671	46,419	39,281	39,135
Wool grease	1,542	1,722	1,067	1,423
Secondary Products				
Stearin, vegetable oil, winter	5,347	5,132	5,513	5,158
Stearin, animal, edible	2,356	1,166	1,761	1,331
Stearin, animal, inedible	1,928	1,647	1,007	1,169
Oleo oil	4,172	2,024	832	1,073
Grease oil and lard oil	5,031	4,025	4,239	4,654
Tallow oil	4,149	3,134	933	1,022
Vegetable oil foots, raw and acidulated soap stock (100% fatty acid content)	20,195	19,651	17,117	16,658
Foots from fish and marine mammal oil (100% basis)	[6]	[6]	1,050	1,040
Animal foots (100% basis)	2,341	2,498	2,292	2,819
Other fatty acid stock including spent and salvaged oils and fats, tall oil, palm oil, refuse, etc.	11,383	10,131	7,706	8,657
Vegetable oil fatty acids from foots and other than from foots including fatty acids from tall oil, palm oil, refuse, etc.	16,777	15,765	12,693	13,826
Fish and marine mammal fatty acids	2,860	3,230	754	805
Animal fat and oil fatty acids	21,427	17,288	19,243	18,101
Red oil or oleic acid	6,343	5,976	5,704	5,064
Stearic acid	4,904	4,806	3,992	3,992
Other Products				
Glycerin, crude (100% basis)	14,063	13,409	13,831	13,687
Glycerin, high gravity and yellow distilled (100% basis)	5,323	5,010	5,588	6,010
Glycerin, chemically pure (100% basis)	7,741	7,636	5,446	6,336
Hydrogenated oils, edible	86,099	86,670	80,855	82,961
Hydrogenated oils, inedible	14,590	15,300	13,603	15,746
Shortening	119,343	118,797	875	966
Winterized vegetable oils	26,555	30,781	...	...

[1] Bureau of Agricultural Economics collected the data on production and stocks from crude peanut oil producers.
[2] Included in "All other" vegetable oils to avoid disclosures of operation of individual establishments.
[3] Fish and Wildlife Service collected the data from fish oil producers.
[4] Includes 446,000 pounds of herring, sardine, and pilchard. No menhaden oil production reported for February.
[5] Includes 3,668,000 pounds of herring, sardine, and pilchard, and 304,000 pounds of menhaden for January.
[6] Not shown to avoid disclosure of individual operations.
[7] Includes 2,004,000 pounds held by producers February.
[8] Includes 1,740,000 pounds held by producers January.
[9] Includes 814,000 pounds held by producers February.
[10] Includes 856,000 pounds held by producers January. *Revised.

exported. The United Kingdom took 74,000 barrels, or 56.5 per cent of the exports.

The big drop in total exports was accounted for by the fact that all European continental countries were cut off from American supplies for the greater part of the year. Germany had been the next biggest customer.

TURPENTINE (50 gal. bbls.)

Year	Production (M bbls.)	Total Exports (M bbls.)	% of Production Exported %	Exported to United Kingdom (M bbls.)	Exported to United Kingdom % of Total Exports
1940..	566	131	23.1	74	56.5
1939..	605	238	39.3	115	48.3
1938..	709	210	29.6	105	50.0
1937..	700	277	39.6	129	46.6
1936..	635	271	42.7	135	49.8
1935..	603	224	37.1	111	49.6
1934..	603	207	34.3	105	50.7
1933..	625	300	48.0	128	42.7
1932..	575	225	39.1	92	40.9
1931..	557	254	45.6	99	39.0
1930..	683	327	47.9	160	48.9
1929..	711	339	47.6	140	41.3
1928..	638	276	43.2	103	37.3
1927..	727	330	45.4	148	44.8
1926..	580	256	44.1	145	56.6
1925..	540	227	42.1	127	55.9
1924..	587	250	42.5	137	54.9
1923..	608	225	37.0	120	53.3

Superphosphate Output At New Peak

The marked upturn in production of superphosphate continued in January, with output in that month exceeding any previous January. Production at plants of acidulators who report their operating statistics to The National Fertilizer Association amounted to 491,000 tons, basis 18% A. P. A., an increase of 5 per cent over January, 1945. This increase over the preceding year was somewhat smaller than that reported in recent months. Production in the first seven months of the current fertilizer year, July through January, was 18 per cent larger than in the corresponding period of last year and was the largest for the like period of any year.

Use of superphosphate in mixed goods has been rising more rapidly than has the tonnage of superphosphate shipped as a separate material, and this trend continued in January. The volume used in mixed goods was at an unusually high level, exceeding January, 1945, by 31 per cent. Increases in the July-January period over last year were 13 per cent in shipments and 23 per cent in the amount used in mixed goods.

Additions to the available supply in January were somewhat greater than the amount disposed of, resulting in a moderate rise in stocks. The increase, however, was less than the usual seasonal increase in January. Stocks at the close of the month were slightly smaller than a year ago. Stocks at plants of acidulators continue low in relation to the current rate of consumption. Stocks in the hands of users are undoubtedly much larger than in earlier years.

Iron Ore Off Sharply

Strikes at iron mines, and the effect of steel strikes on iron ore markets resulted in a 61 per cent decline in iron ore output during February. Output totaled only 768,387 gross tons compared with 1,973,692 tons in January, and 2,397,097 tons in February 1945. Shipments from mines and mills amounted to 472,641 tons—a decrease of 39 per cent from January. In February 1945, shipments totaled 1,139,434 gross tons.

According to the Bureau of the Census, imports of iron ore in February totaled 75,259 gross tons valued at $217,305. Of this quantity, Chile supplied 44,200 tons, Algeria 19,050 tons, Tunisia 4,616 tons, French Morocco 3,000 tons and France 2,269 tons. The remaining 2,124 tons were received from Argentina, Belgium, Canada, Cuba, Mexico and the United Kingdom.

SUPERPHOSPHATE

Production, Receipts, Disposition, and Stocks By Type—January 1946

In short tons (2000 pounds)

January 1946 statistics are based on the reports of 161 plants, of which 158 manufacture normal superphosphate, nine manufacture concentrated superphosphate and seven manufacture wet-base goods. Three plants produce concentrated superphosphate exclusively, while 158 plants produce normal material only, or normal and concentrated or normal and wet-base goods. One plant has permanently discontinued operations.

These statistics include data for all plants, including government owned, known to have facilities for superphosphate manufacture. All quantities are expressed in equivalent short tons of the indicated A.P.A. (available phosphoric acid) percentage content. The statistics pertain only to superphosphate as such, and include no data for superphosphate in dry-base or dry-mixed goods. Figures for receipts of material, shipments, consumption and stocks relate only to plants which actually produce superphosphate. Cases in which book figures differ from actual physical inventory are covered under the heading "Book Adjustments," the amount of book excess being indicated by a minus sign (−) and the amount of book deficit by a plus sign (+). The use of this device makes possible a full accounting of all quantities of each type of superphosphate.

Item	Normal 18% APA	Concentrated 45% APA	Wet-base goods 18% APA
January 1946			
Stocks on hand, beginning of month	808,027	32,556	15,577
Production	650,040	25,419	4,086
Received from other acidulators (inc. exchange transfers)	8,957	–	–
Brook adjustments (account of inventory)	−385	+62	–
Total supply	1,466,639	58,037	19,663
Disposition, total	652,802	22,374	3,040
Shipments, total	353,234	21,978	1,077
Used in reporting plants	299,568	396	1,963
Stocks on hand, end of month	813,837	35,663	16,623
January 1945			
Stocks on hand, beginning of month	794,778	32,488	13,106
Production	626,947	18,103	4,302
Received from other acidulators (inc. exchange transfers)	12,364	–	–
Book adjustments (account of inventory)	+2,095	–	–
Total supply	1,436,184	50,591	17,408
Disposition, total	575,097	25,771	4,114
Shipments total	340,227	25,634	3,441
Used in reporting plants	234,870	137	673
Stocks on hand, end of month	861,087	24,820	13,294

SALES OF LACQUER

(Including Sales of Package Goods to Jobbers and Dealers)

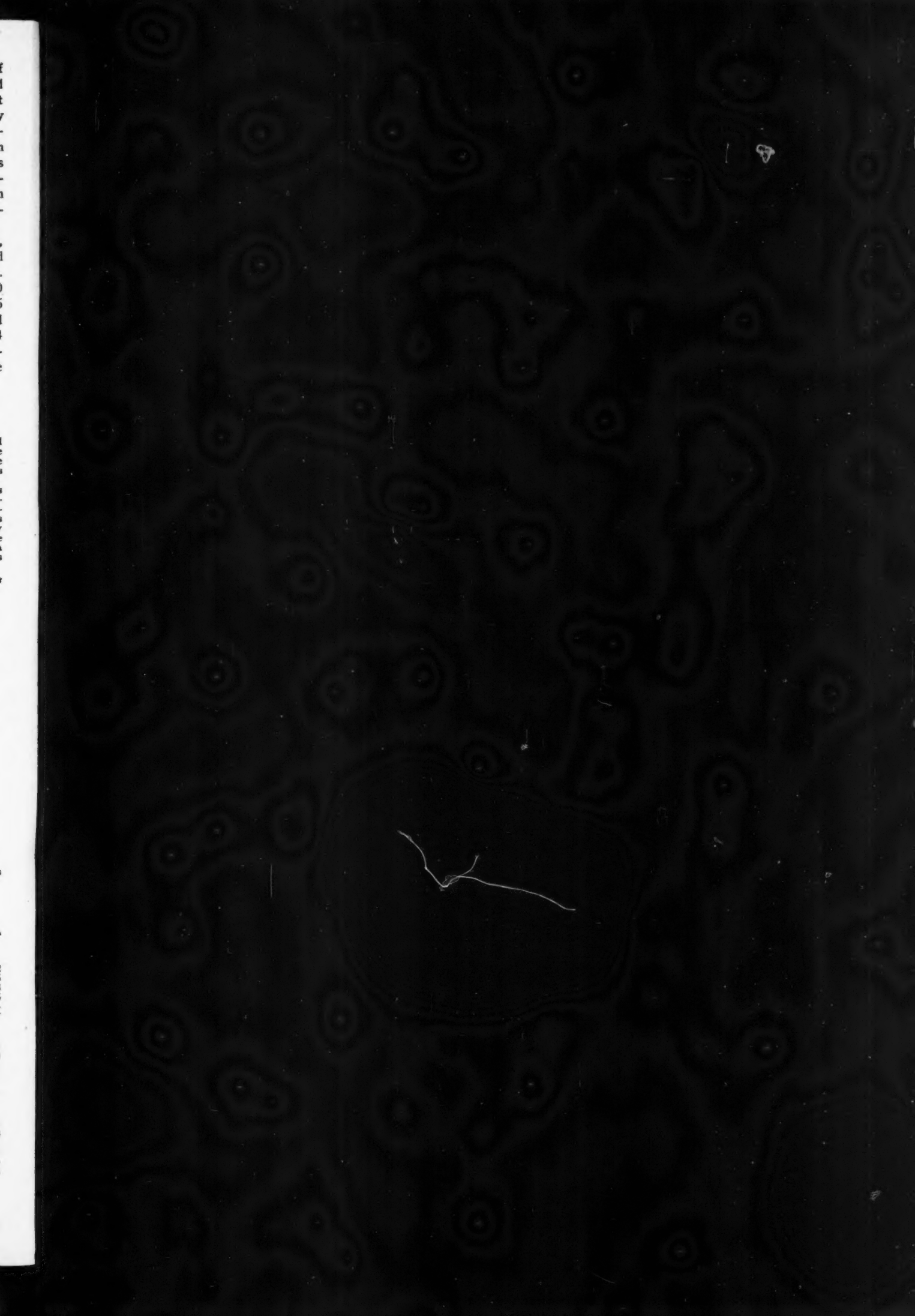
Fourth Quarter 1945

Data are for sales of 158 identical manufacturers and represent approximately 84 per cent of the total value of lacquers as reported in the Census of Manufactures, 1939. Comparable figures are available beginning with the third quarter 1934.

Sales of Lacquer (158 Identical Manufacturers)

Year and Quarter	Total Gallons	Total Value	Clear Lacquers Gallons	Clear Lacquers Value	Pigmented Lacquers Gallons	Pigmented Lacquers Value	Bases and Dopes Gallons	Bases and Dopes Value	Thinners Gallons	Thinners Value
1945										
First quarter	14,467,630	$21,037,295	3,829,659	$6,027,551	3,608,700	$8,031,607	894,874	$1,174,195	6,134,397	$5,803,942
Second quarter	15,030,134	21,907,822	4,090,589	6,446,433	3,530,998	7,912,913	1,062,553	1,492,260	6,345,994	6,056,216
Third quarter[1]	14,625,734	20,909,645	3,928,514	6,136,921	3,449,207	7,629,930	805,943	1,100,661	6,442,070	6,042,133
Fourth quarter	13,063,991	19,752,790	4,087,248	6,472,836	3,391,069	7,680,304	815,643	1,057,594	4,770,031	4,542,056
Total (year)	57,187,489	83,607,552	15,936,010	25,083,741	13,979,974	31,254,754	3,579,013	4,824,710	23,692,492	22,444,347
1944										
First quarter	13,299,357	19,269,573	3,652,379	5,686,251	3,534,862	7,653,841	931,398	1,179,278	5,180,718	4,750,203
Second quarter	12,865,678	18,973,064	3,302,153	5,148,027	3,463,824	7,786,672	859,723	1,105,190	5,239,978	4,933,175
Third quarter	13,641,511	19,948,728	3,408,370	5,454,372	3,613,567	8,082,702	830,343	1,069,401	5,789,231	5,342,253
Fourth quarter	13,634,718	19,916,687	3,503,544	5,372,428	3,637,316	8,074,249	858,057	1,110,086	5,635,801	5,359,924
Total (year)	53,441,264	78,108,052	13,866,446	21,661,078	14,249,569	31,597,464	3,479,521	4,463,955	21,845,728	20,385,555
1943										
First quarter	12,534,423	17,215,910	3,517,085	5,289,564	2,875,454	6,126,822	784,067	1,047,000	5,357,817	4,752,524
Second Quarter	13,155,267	18,847,349	3,307,723	5,044,246	3,530,801	7,739,176	778,940	1,042,019	5,537,803	5,021,908
Third quarter	13,787,405	19,568,415	3,408,171	5,299,317	3,537,056	7,723,766	878,468	1,243,399	5,963,710	5,301,933
Fourth quarter	13,039,442	18,829,703	3,524,863	5,461,208	3,277,617	7,211,456	1,065,346	1,377,616	5,171,616	4,779,423
Total (year)	52,516,537	74,461,377	13,757,842	21,094,335	13,220,928	28,801,220	3,506,821	4,710,034	22,030,946	19,855,788

[1] Revised



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MARKET OUTLOOK

Prolonged Lead Shortage Foreseen

No Immediate Easing Of Borax Probable

Soybean Cut to Affect Paintmakers

Market Review

Lead Shortage to Continue

After World War I lead was frequently referred to as the "precious metal," reflecting the marked difference between the prewar price of 4 cents a pound and the 7, 8, 9 and even 10 cents which materialized shortly thereafter. Perhaps history is repeating itself, for it is now quite possible that the OPA 6.5 cent ceiling will be adjusted upward after June 30, with such a price increase automatically carrying through to lead's chemical derivatives.

Actually, the listed 6.5 cent figure does not truly mirror lead's status, for last year the government paid about $17.5 million in subsidies so that miners would maintain production. Too, the metal is already selling abroad at higher prices than in the U. S.—which is directly contrary to usual circumstance. In the past, with the exception of 1937-38, lead has always brought a higher price in the U. S. than in any other country in the world. Even more curious is the fact that the government will have to subsidize producers of any foreign lead to be imported. All of which is a reflection of lead's current strong position—stronger than that of any domestically mined nonferrous metal.

Lead consumption has eased but little from its wartime rate of over a million tons a year, and only because of strict government end-use controls. Furthermore, demand is not expected to decline in the first postwar years to anything like the rate of the late '30's. In those "below normal" years consumption averaged 650,000 tons; in the late '20's it stood close to 900,000 tons.

What are the major uses of the inert metal? Storage batteries, cable sheathing, and tetraethyl (77,000 tons), account for the heaviest proportion of mine output. In the past three years, these markets alone totaled more than entire domestic production of the metal. White lead processors also requisition 75,000 to 100,000 tons annually, and 135,000 tons were channelled to chemical manufacturers last year. Sheet and pipe, which includes lead used in chemical construction, amounted to 75,000 tons.

It is hardly news that domestic production has declined in the past year. Some reports maintain that this has been due to a dwindling of ore reserves; others that the main influence has been the labor shortage. Industry officials emphasize the latter viewpoint and maintain that the ore reserves of the U. S. are far from depleted and that an additional 4000 miners could increase production 25 to 35 per cent. The addition of such manpower, and the return of a free market, they claim, would do much to alleviate the present stringency.

Present government plans are predicated on the importation of more than twice as much lead in the second half of this year as in the first six months and, if negotiations are concluded successfully, imports will be boosted from 32,500 tons to 78,000 tons for the half year. An agreement has been reached with Canada for an additional monthly import quota of 2,500 tons at 7¾ cents, and it is hoped that an extra 5000 tons a month may be obtained from Peru and Mexico.

Authorized consumption of lead for 1946, according to present allocations, is 1,040,000 tons. Total anticipated supplies from all quarters amount to 840,000 tons. Therefore a net deficit of 200,000 tons is in prospect, which may well necessitate further cuts in allotments.

Market Review

Heavy Chemicals—The entire market continued active and firm during the month with inquiries for substantial export tonnages of many items aggravating existing shortages. Prices held up well, with few exceptions, such as the unsettled aspects of carbon tetrachloride and potassium permanganate. The former eased to 69 cents in carlots and the latter declined 7 cents from its former 45 cent level.

With seasonal influences at work, more inquiries for sodium fluoride and silicofluoride reached the market, which is now beginning to feel the stepping up of the ceramic industry—one of its prime customers. Occasional resale lots of sodium bichromate were offered on spot, and quickly sold, but the potassium salt remained almost unobtainable. Although bleaching powder is being turned out in adequate tonnage, container shortages caused some delivery delays.

Sodium bicarbonate demand was augmented by the soda ash shortage, and caustic soda producers refused to make definite commitments. Di- and trisodium phosphate did not ease appreciably, with January production listed as below 1944's.

Agricultural Chemicals—The coal strike has already affected ammonium sulfate production seriously, and superimposed on the recent steel difficulties, the situation is far from encouraging.

Potash shipments are said to have slowed appreciably during the month, and reduced output of phosphate rock is imperilling superphosphate prospects. Although over 50 per cent of the U. S. allocation of Chilean nitrate has been filled—from a total quota of 700,000 tons—it is expected that an overall eastern fertilizer shortage may materialize. In view of the advanced season, additional receipts may be consigned to southern agriculture.

Copper sulfate, with output at low ebb as a result of labor troubles at producing units, remained tight. Several thousand tons of Canadian material was offered at 5 cents a pound, but additional lots are not expected until late in the season. The highly competitive situation which has existed in the DDT market for several months remained unchanged; quoted openly at 45 cents a pound, inside transactions at 40 cents a pound on carlots are said to have been completed.

Fine Chemicals—Many inquiries for saccharine, thymol, and antipyrine were received during the month, but the status of these items remained tight. Such prospects of an easing in the thymol market as existed some few months ago now appear to have evaporated.

Bromides, with the exception of silver, continued in ample supply, but the silver salt, in keeping with all silver compounds has been adversely affected by Federal legislation and the strikes which have beset Mexican miners—who normally supply 35 per cent of U. S. consuming needs. Menthol displayed a contra-seasonal trend, for although prices held up, little advance buying was uncovered. Purchasers appear to view the arrival of Far East shipments as a possibility which may modify Brazilian quotations.

Developments in phenobarbital, salicylates, and other coal tar chemicals bear watching, in view of coal strike implications. Gum arabic, too, is firming with dealers reluctant to sell below 14 cents. This action is attributed to a strengthening of source quotations, and the fact that 3000 tons of the gum was shipped by producers to India recently.

Glycerin output in February increased 645,000 pounds—to stand at 14,630,000 pounds for the month—but demand still outstrips supply.

Unexpected Demand Tightens Borax

The marked tightness in the supply position of borax, boric acid, and other borates, which has existed for some months, is only of a temporary nature, according to trade sources, and the situation is expected to improve toward the end of the year. However, no immediate relief is in prospect, due to the fact that production facilities cannot be expanded rapidly enough to meet the extraordinary demand.

Ironically enough, U. S. borax producers in years past experienced some difficulty in marketing their product, so they engaged in research to develop new uses, and pared basic prices. Their action proved to be too fruitful, so that today demand far outstrips supply.

Several conditions contribute to the immediate situation. At the conclusion of the war borax inventories were not overly large, and producers did not anticipate the continuance of peak consuming levels. Secondly, the rapid conversion of porcelain enamelling facilities to peacetime production—normally absorbing half the U. S. borax—has resulted in heavy tonnage calls for the chemical. A demand, incidentally, which is not expected to abate for a full five years. Too, radio manufacturers are requisitioning borates, for use in electrolytic condensers, on a scale far in excess of past purchases.

In addition, borax is an important raw material for the glass industry—and activity in this field is far greater than was the case in prewar days. Heat-resistant glasses—such as Pyrex—have won wider acceptance, and containing 12 to 14 per cent boric oxide have provided an additional burden for borax processors. Likewise, earlier research revealed that the addition of one per cent boric oxide to ordinary soda-lime-silicate glasses, used in bottle and pressed ware, was desirable so that tonnage consumption of borax in this field has grown substantially.

An incidental, but influential factor, is the current shortage of phosphates. During the war a number of detergent compounders substituted borax for scarce phosphatic alkalines. In that phosphates are not as yet readily available, this practice has continued.

The long term outlook, however, is satisfactory. The U. S. normally produces 90 to 95 per cent of the world's borates, and in the past exported more than one-half of its output to England, Germany, Japan, France, Belgium, Canada, and Australia. Currently export orders are receiving but token consideration.

California reserves of borax are ample to accommodate all industrial needs for many years to come, and the construction of additional facilities, some of which are now underway, will bring the supply-demand picture more in line. But, such a balance will not be struck until at least the latter part of this year.

Soybean Oil Cut Curtails Paintmakers

Manufacturers of paint and varnish using soybean oil in their products now face a reduction in their rate of output established during the final quarter of last year as a result of the recent Dept. of Agriculture order revising the base period for monthly allotments. However, soapmakers may continue production at final quarter rates.

The revised order stipulates that industrial soybean users—making inedible products—may use in any calendar month not more than one-ninth of the quantity consumed in the first nine months of 1945. Formerly, natural limitations on the rate of use, and government priorities as well as other restricting orders, had served to satisfactorily control the use of oils. In addition to soybean, the directive also covers cottonseed, peanut, and corn oil.

Trade statistics reveal that paint and varnish makers sharply increased their use of soybean in the final quarter of last year, from a first quarter consumption of 5,200,000 pounds to 9,700,000 pounds, for the concluding three months' period. Thereby, allocations now represent a 46 per cent cutback from late 1945.

In the meantime, soapmakers using soybean will be able to maintain fourth quarter output, with average consumption figures of 1,007,000 pounds for last year.

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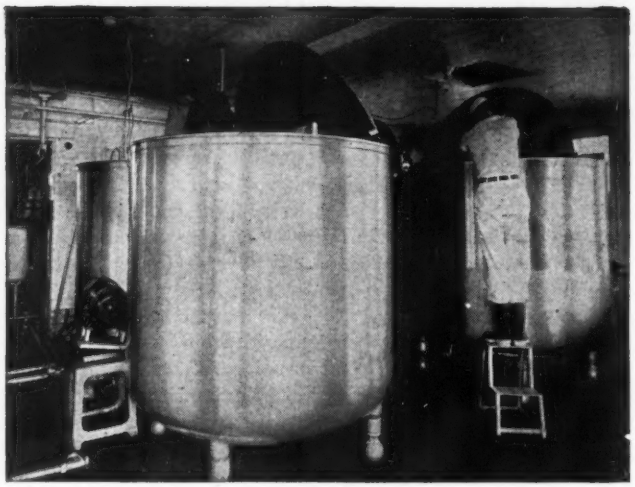

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Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00
April, 1944, $0.890 *April, 1945, $0.871*
April, 1946, $0.842

	Current		1946		1945	
	Low	High	Low	High	Low	High
Acetaldehyde,99%,drs.wks. lb.	.11	.14	.11	.14	.11	.14
Acetic Anhydride, drs, ...lb.	.11½	.13	.11½	.13	.11½	.13
Acetone, tks, delv. .....lb.	.06	.07	.06	.07	.06	.07
ACIDS						
Acetic, 28%, bbls ....100 lbs.	3.38	3.63	3.38	3.63	3.38	3.63
glacial, bbls. .....100 lbs.	9.15	9.40	9.15	9.40	9.15	9.40
tks, wks. .....100 lbs.	6.93	7.25	6.93	7.25	6.93	7.25
Acetylsalicylic, Standard USP .....lb.	.40	.54	.40	.54	.40	.54
Benzoic, tech. bbls. .....lb.	.43	.47	.43	.47	.43	.47
USP, bbls, 4,000 lbs. up lb.	...	.54	...	.54	...	.54
Boric tech, bbls. c-l. ..tons *a*	...	109.00	...	109.00	...	109.00
Chlorosulfonic, drs, wks. ..lb.	.03	.04½	.03	.04½	.03	.04½
Citric, USP, crys, gran, bbls. .....lb. *b*	.20	.21	.20	.21	.20	.21
Cresylic 50%, 210-215° HB, drs. wks. frt. equal gal.	.81	.83	.81	.83	.81	.83
Formic, 85%-90% cbys...lb.	.10	.11½	.10	.11½	.10	.11½
Hydrofluoric, 30% rubber, dms. .....lbs.	.08	.09	.08	.09	.08	.09
Lactic, 22%, lgt, bbls wks lb.	.039	.0415	.039	.0415	.039	.0415
44%, light, bbls wks ...lb.	.073	.0755	.073	.0755	.073	.0755
Maleic, Anhydride, drs ...lb.	.25	.26	.25	.26	.25	.26
Muriatic 18° cbys ....100 lb.	1.50	2.45	1.50	2.45	1.50	2.45
20° cbys, c-l, wks. ..100 lb.	...	1.75	...	1.75	...	1.75
22° cbys, c-l, wks. ..100 lb.	...	2.25	...	2.25	...	2.25
Nitric,36°,cbys, wks 100 lbs. *c*	5.00	5.25	5.00	5.25	5.00	5.25
38°, c-l, cbys, wks 100 lbs. *c*	...	5.50	...	5.50	...	5.50
40°, c-l, cbys, wks 100 lbs. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lbs. *c*	...	6.50	...	6.50	...	6.50
Oxalic, bbls, wks .....lb.	.11¼	.12½	.11¼	.12½	.11¼	.12½
Phosphoric, 100 lb. cbys, USP .....lb.	.10½	.13	.10½	.13	.10½	.13
Salicylic tech, bbls .....lb.	.26	.42	.26	.42	.26	.42
Sulfuric, 60°, tks, wks ..ton	...	13.00	...	13.00	...	13.00
66°, tks, wks .....ton	...	16.50	...	16.50	...	16.50
Fuming 20% tks, wks..ton	...	19.50	...	19.50	...	19.50
Tartaric, USP, bbls .....lb.	.62½	.63	.62½	.71	.70½	.71
Alcohol, Amyl (from Pentane) tks, delv .....lb.	...	.131	...	.131	...	.131
Butyl, normal, syn, tks lb.	...	.10¾	...	.10¾	...	.10¾
Denatured, CD 14, c-l drs .....gal. *d*	...	.613	...	.613	...	.59
Denatured, SD, No. 1, tks.*d*	...	.542	...	.542	...	.52
Ethyl, 190 proof tks...gal.	...	17.65½	...	17.65½	...	17.60
Isobutyl, ref'd, drs ....lb.	...	.0660	...	.0660	...	.086
Isopropyl ref'd, 91%, dms .....gal.	.38	.41	.38	.41	.37½	.66½
Alum, ammonia, lump, bbls, wks .....100 lb.	...	4.25	...	4.25	...	4.25
Aluminum, 98-99% ...100 lb.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd l.c.l. wks lb.	.09	.12	.09	.12	.08	.12
Hydrate, light, bgs. ....lb.	...	.14½	...	.14½	.14½	.15
Sulfate, com'l. bgs, wks, c-l .....100 lb.	1.15	1.25	1.15	1.25	1.15	1.25
Sulfate, iron-free, bgs, wks .....100 lb.	1.75	2.00	1.75	2.00	1.75	2.10
Ammonia anhyd, cyl .....lb.	...	.14½	...	.14½	...	.14½
Ammonia, anhyd. fert. tank cars, wks. frt. equalized ton	...	59.00	...	59.00	...	59.00
Ammonium Carbonate, USP, lumps, dms ....lb.	.08¼	.09½	.08¼	.09½	.08¼	.09¼
Chloride,whi,bbls,wks,100 lb.	4.45	5.15	4.45	5.15	4.45	5.15
Nitrate, tech. bags, wks. lb.	.0435	.0450	.0435	.0850	.0435	.0850
Oxalate pure, grn. bbls. lb.	...	.23	...	.23	.27	.33
Perchlorate, kgs .....lb.	no stocks		no stocks		no stocks	
Phosphate, dibasic tech. bgs .....lb.	.07	.07¾	.07	.07¾	.07	.08½
Stearate, anhyd. dms....lb.	...	.34	...	.34	...	.34
Sulfate, dms, bulk ....ton	28.20	29.20	28.20	29.20	28.20	29.20
Amyl Acetate (from pentane) tks., delv. .....lb.	...	.14½	...	.14½	...	.15½
Aniline, Oil, drs .....lb.	.11½	.12½	.11½	.12½	.11½	.12½
Anthraquinone, sub, bbls...lb.	...	.70	...	.70	...	.70
Antimony Oxide, bgs ....lb.	.16	.17	.15	.17	.15	.16
Arsenic, whi, kgs—powd. lb.	.04	.04¾	.04	.04¾	.04	.04¾

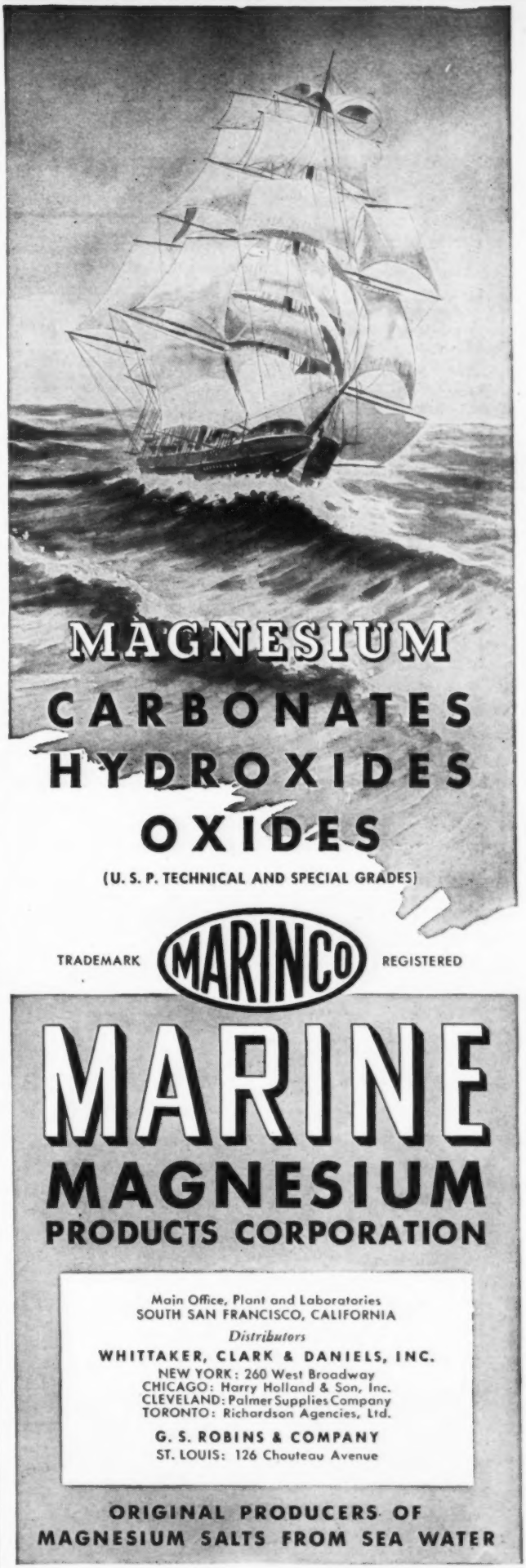
USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; y Price given is per gal; c Yellow grades 25c per 100 lbs less in each case; *d* Prices given are Eastern schedule. *a* Powdered boric acid $5 a ton higher; *b* Powdered citric acid is ½¢ higher.

	Current Low	Current High	1946 Low	1946 High	1945 Low	1945 High
Barium Carbonate precip, wks, bgs. ....ton	60.00	75.00	60.00	75.00	60.00	75.00
Chloride, tech, cyst, bgs, zone 1 ....ton	73.00	78.00	73.00	78.00	73.00	78.00
Barytes, floated, bbls. ....ton	...	36.00	...	36.00	...	36.00
Bauxite, bulk mines ....ton	7.00	10.00	7.00	10.00	7.00	10.00
Benzaldehyde,tech,cbys,dms lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, tks, ft all'd ....gal.	...	.15	...	.15	...	.15
Benzyl Chloride, cbys ....lb.	.20	.21	.20	.24	.22	.24
Beta-Naphthol, tech, bbls, wks ....ton	.21	.23	.21	.24	.23	.24
Bismuth metal, ton lots...lb.	...	1.25	...	1.25	...	1.25
Blanc Fixe, 66⅔% Pulp, bbls, wks ....ton h	40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, wks,100 lb.	2.50	3.10	2.50	3.60	2.50	3.60
Borax, tech, c-l, bgs ....ton i	...	45.00	...	45.00	...	45.00
Bordeaux Mixture, drs ...lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases ....lb.	.21	.23	.21	.23	.21	.30
Butyl, acetate, norm. drs lb.	.2035	.2085	.1860	.2085	17.90	19.45
Cadmium Metal ....lb.	.90	.95	.90	.95	.90	.95
Calcium, Acetate, bgs, 100 lb.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs ....ton	50.00	90.00	50.00	90.00	50.00	95.00
Carbonate, c-l bgs ....ton	18.00	22.00	18.00	22.00	18.00	22.00
Chloride, flake, bgs c-l ton	18.50	35.00	18.50	35.00	18.50	35.00
Solid, 73-75% drs, c-l, ton	18.00	34.50	18.00	34.50	18.00	34.00
Cy'n'd, min. 21% N, c.l. lb.	.02¼	.02¾	...	...	...	...
Gluconate, U.S.P., drs. lb.	.57	.59	.57	.59	.57	.59
Phosphate, tri, bbls, cl..lb.	...	.0635	...	.0635	...	.0635
Camphor, U.S.P., gran, powd, bbls ....lb.	.69	.71	.69	.71	.69	.71
Carbon Bisulfide, 55-gal drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, cyl ....lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, Zone 1, 52½ gal. drms ....gal.	.69	.76	.69	.80	.73	.80
Casein, Acid Precip, bgs, 100 or more ....lb.	...	.24	...	.24	...	.24
Chlorine, cyls, lcl, wks, contract ....lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract ..lb. j	...	.05¼	...	.05¼	...	.05¼
Liq. tk, wks, contract 100 lb.	...	1.75	...	1.75	...	1.75
Chloroform, tech, drs ....lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude ....bbl.	8.25	8.75	8.25	8.75	8.25	8.75
Cobalt, Acetate, bbl ....lb.	...	.83¾	...	.83¾	...	.83¾
Oxide, black kgs ....lb.	...	1.84	...	1.84	...	1.84
Copper, metal....100 lb.	12.00	12.50	12.00	12.50	12.00	12.50
Carbonate, 52-54%, bbls. lb.	.19½	.20½	.19½	.20½	.19½	.20½
Sulfate, bgs, wks cryst, ...100 lb.	5.00	5.50	5.00	5.50	5.00	5.50
Copperas, bulk, c-l, wks ..ton	...	14.00	...	14.00	...	14.00
Cresol, USP, drs ....lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.11¾
Dibutylamine, c-l, drs, wks,	...	.66	...	.66	...	.66
Dibutylphthalate, drs ....lb.	.1700	.2359	.1700	.2359	.1770	.2359
Diethylaniline, lb drs ....lb.	...	.40	...	.40	...	.40
Diethyleneglycol, drs, wks lb.	.14	.15	.14	.15	.14	.15½
Dimethylaniline, dms,cl.,lcl lb.	.21	.22	.21	.22	.23	.24
Dimethyl phthalate, drs ...lb.	.20	.20½	.20	.20½	.20	.20½
Dinitrobenzene, bbls ....lb.	...	.18	...	.18	...	.18
Dinitrochlorobenzene, dms.lb.	...	.14	...	.14	...	.14
Dinitrophenol, bbls ....lb.	...	.22	...	.22	...	.22
Dinitrotoluene, dms ....lb.	...	.18	...	.18	...	.18
Diphenyl, bbls lcl. wks. ...lb.	.16	.20	.16	.20	.16	.20
Diphenylamine bbls ....lb.	...	.25	...	.25	...	.25
Diphenylguanidine, drs ...lb.	.35	.37	.35	.37	.35	.37
Ethyl Acetate, tks, frt all'd lb.	.0950	.1175	.0950	.1175	.0975	.1175
Chloride, drs ....lb.	.18	.20	.18	.20	.18	.20
Ethylene Dichloride, lcl. wks, E. Rockies, dms....lb.	.0891	.0941	.0842	.0941	.0842	.0941
Glycol, dms, cl. ....lb.	...	.10	...	.10	...	.10
Fluorspar, No. 1, grd.95-98% bulk, cl-mines ....ton	...	37.00	...	37.00	...	37.00
Formaldehyde, bbls, cl & lcl ....lb.	.0520	.0570	.0520	.0570	.0520	.0570
Furfural tech, dms, c-l,wks lb.	...	.13	...	.13	...	.13
Fusel Oil, ref'd, dms, dlvd lb.	.18½	.19½	.18½	.19½	.18½	.19½
Glauber's Salt, Cryst, c-l, bgs, bbls, wks ....100 lb.	1.05	1.45	1.05	1.45	1.05	1.45
Glycerine dynamite, dms, c-l, ...lb.	.17½	.18¼	.17½	.18¼	...	.16½
Crude Saponification, 80% to refiners tks ....lbs.	...	.11½	...	.11	.09½	.11½

GUMS

Gum Arabic, amber sorts bgs lb.	.13½	.14	.11¾	.14	.11	.13
Benzoin Sumatra, CS ....lb.	.52	1.00	.52	1.00	.52	1.00
Copal, Congo ....lb.	...	.55¾	...	.55¾	...	.55¾
Copal, East India, chips ..lb.	...	.53¾	...	.53¾	...	.53¾
Macassar dust ....lb.	...	.07⅜	...	.07⅜	...	.07⅜
Copal Manila,	.13½	.15½	.13½	.15½	.13½	.15½
Copal Pontianak, bold c-l lb.	...	.17⅜	...	.17⅜	...	.23⅜
Karaya, bbls, bxs, dms...lb.	.18	.46	.18	.46	.15	.46

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.



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BETA NAPHTHYL BENZOATE, N. N. R.

CALCIUM BENZYL PHTHALATE, pure

BENZYL DISULFIDE

CALCIUM IODOBEHENATE, U. S. P.

CALCIUM LEVULINATE, pure

CAMPHOSULFONATES

CAMPHORIC ACID, C. P.

ETHYL CHAULMOOGRATE, U. S. P.

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HEXAMETHYL — DIAMINOISOPROPANOL-DI-IODIDE Quaternary Ammonium Compound (chemical name for Endoiodin and Iodisan)

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4 x 8 lbs.	lb.	3.50
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4 lb. tin	lb.	4.00
2 lb. tin	lb.	4.25
1 lb. bottle	bot.	4.75

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Manufacturing Chemists

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Current Prices

Gums
Salt Lake

	Current Low	Current High	1946 Low	1946 High	1945 Low	1945 High
Kauri, N. Y.						
Superior Pale XXX....lb.	...	.65¾	...	.65¾	...	.65¾
No. 3 .....lb.	...	.22	...	.22	...	.22
Sandarac, cs .....lb.	.97½	.99½	.97½	.99½	...	.99½
Tragacanth, No. 1, cases ..lb.	3.75	3.80	3.75	3.90	3.80	5.00
No. 3 .....lb.	2.10	2.15	2.10	2.60	2.15	3.00
Yacca, bgs .....lb.	.05	.07¼	.05	.07¼	.06	.07¼
Hydrogen Peroxide, cbys ..lb.	.15½	.18½	.15½	.18½	.15½	.18½
Iodine, Resublimed, jars..lb.	1.75	1.85	1.75	1.85	1.75	2.10
Lead Acetate, cryst, bbls...lb.	...	.12½	...	.12½	...	.12½
Arsenate basic, bg, lcl..lb.	.12	.12½	...	.12	.11½	.12
Nitrate, bbls. .....lb.	...	.12½	...	.12½	...	.12½
Red, dry, 95% Pb_3O_4 bbls. .....lb.	.09	.10¾	.09	.10¾	.09	.10¾
97% Pb_3O_4, bbls delv..lb.	.09½	.11	.09½	.11	.09¼	.11
98% Pb_3O_4, bbls delv..lb.	.09½	.11¼	.09½	.11¼	.09½	.11¼
White, bbls .....lb.	.08¼	.08¾	.08¼	.08¾	.08¼	.08¾
Basic sulfate, bbls, lcl lb.	.07¼	.08	.07¼	.08	.07¼	.08
Lime, Chem., wks, bulk..ton	6.50	9.25	6.50	9.25	6.25	13.00
Hydrated, f.o.b. wks ..ton	8.50	12.00	8.50	12.00	8.50	16.00
Litharge, coml, delv. bbls..lb.	.08	.09¾	.08	.09¾	.08	.09¾
Lithopone, ordi., bgs .....lb.	.04¼	.04½	.04¼	.04¾	.04¼	.04¾
Magnesium Carb, tech, wks lb.	.07¼	.10¾	.07¼	.10¾	.06¼	.10¾
Chloride flake, bbls, wks c-l .....ton	...	32.00	...	32.00	...	32.00
Manganese, Chloride, Anhyd. bbls. .....lb.	.14	.16	.14	.18	.15	.18
Dioxide, Caucasian bgs, lcl .....ton	74.75	79.75	74.75	79.75	74.00	79.75
Methanol, pure, nat, drs gal *l*	.63	.73	.63	.73	.63	.76
Synth, drs cl .....gal. *m*	.24	.38	.24	.38	.31	.38
Methyl Acetate, tech tks..lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv lb.	.09½	.10½	.09½	.10½	.09½	.10½
Chloride, cyl .....lb.	.32	.40	.32	.40	.32	.40
Ethyl Ketone,tks,frt all'd lb.	...	.08	...	.08	...	.08
Naphtha, Solvent, tks ...gal.	...	.27	...	.27	...	.27
Naphthalene, crude, 74°, wks tks .....lb.	...	.0275	...	.0275	...	.0275
Nickel Salt, bbls, NY ....lb.	.13	.13½	.13	.13½	.13	.13½
Nitre Cake, blk .....ton	...	16.00	...	16.00	...	16.00
Nitrobenzene, drs, wks ...lb.	.08	.09	.08	.09	.08	.09
Orthoanisidine, bbls .....lb.	...	.70	...	.70	...	.70
Orthochlorophenol, drs ...lb.	.25	.27	.25	.27	.25	.27
Orthodichlorobenzene, drms lb.	.07	.08	.07	.08	.07	.08
Orthonitrochlorobenzene, wks .....lb.	.15	.18	.15	.18	.15	.18
Orthonitrotoluene, wks, dmslb.	...	.09	...	.09	...	.09
Paraldehyde, 98%, wks lcl .....lb.	...	.12	...	.12	...	.12
Chlorophenol, drs .....lb.	.24	.27	.24	.27	.25	.32
Dichlorobenzene, wks ...lb.	.11	.15	.11	.15	.11	.15
Formaldehyde, drs, wks lb.	.21	.22	.21	.22	.21	.22
Nitroaniline, wks, kgs...lb.	.41	.43	.41	.45	.43	.45
Nitrochlorobenzene, wks lb.	...	.15	...	.15	...	.15
Toluenesulfonamide, bbls lb.	...	.70	...	.70	...	.70
Toluidine, bbls, wks ...lb.	...	.48	...	.48	...	.48
Penicillin, ampules per 100,00 units	.60	.75	.55	.95	.59	2.40
Pentaerythritol, tech ...lb.	.27	.31	.27	.31	.27	.33
PETROLEUM SOLVENTS AND DILUENTS						
Lacquer diluents, tks, East Coast .....gal.	...	.11½	...	.11½	...	.11
Naphtha, V.M.P., East tks, wks .....gal.	...	.11	...	.11	...	.11
Rubber solvents, East, tks, wks .....gal.	...	.11	...	.11	...	.11
Stoddard Solvents, East, tks, wks .....gal.	...	.10	...	.10	...	.10
Phenol, U.S.P., drs .....lb.	.10½	.11¼	.10½	.11¼	.10½	.11¼
Phthalic Anhydride, cl and lcl, wks .....lb.	.13	.14	.13	.14	.13	.14
Potash, Caustics, 88-92%, wks, sol. .....lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
Flake, 88-92% .....lb.	.07	.07½	.07	.07½	.07	.07½
liquid, 45% basis, tks lb.	...	.02⅞	...	.02⅞	...	.0275
dms, wks .....lb.	.03¼	.03½	.03	.03½	.03	.03½
Carbonate, hydrated 83-85% .....lb.	...	.05½	...	.05½	.05½	.05¾
Chlorate crys, bgs, wks lb.	.11	.13	.11	.13	.11	.13
Chloride, crys, tech, bgs, kgs .....lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks .....lb.	...	.55	...	.55	...	.55
Iodide, bots., or cans ...lb.	1.44	1.48	1.44	1.48	1.44	1.48
Muriatic dom, 60-62-63% K_2O bulk unit-ton ...ton	...	.53½	...	.53½	.53½	.56
Permanganate, USP, wks dms .....lb.	.20½	.21	.20½	.21	.20½	.21
Sulfate, 90%, basis, bgs ton	...	36.25	...	36.25	...	36.25
Propane, group 3, tks....gal.	...	.03¾	...	.03¾	...	.03¾
Pyridine, ref., drms .....lb.	.45	.45½	.45	.45½	.45½	.46
R Salt, 250 lb bbls, wks lb.	...	.65	...	.65	...	.65
Resorcinol, tech, drms, wks lb.	.64	.74	.64	.74	.64	.75
Rochelle Salt, cryst .....lb.	.38½	.42	.38½	.47	.43½	.47
Salt Cake, dom, blk wks..ton	...	15.00	...	15.00	...	15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided in 4 zones, prices varying by zone.

* Spot price is ½c higher.

	Current Low	Current High	1946 Low	1946 High	1945 Low	1945 High
Saltpeter, grn, bbls. ..100 lb.	8.20	8.60	8.20	8.60	8.20	8.60
Shellac, Bone dry, bbls. .lb.	r .42½	.46	.42½	.46	.42½	.46
Silver Nitrate, 100 oz, bots 2,500-oz. lots .....oz.	.47	.47¾	.47	.47¾	.47	.47¾
Soda Ash, 58% dense, bgs, c-l, wks .....100 lb.	...	1.15	...	1.15	...	1.15
58% light, bgs cl....100 lb.	1.05	1.18	1.05	1.18	1.05	1.13
Caustic, 76% flake drms, cl .....100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drms,cl 100 lb.	...	2.30	...	2.30	...	2.30
Liquid, 47-49%, sellers, tks .....100 lb.	...	1.95	...	1.95	...	1.95
Sodium Acetate, anhyd. dms .....lb.	.08½	.10	.08½	.10	.08½	.10
Benzoate, USP dms ....lb.	.46	.52	.46	.52	.46	.52
Bicarb, tech., bgs., cl., works .....100 lb.	1.55	1.90	1.55	1.90	1.55	1.90
Bichromate, bgs,wks l.c.l. lb.	.07⅞	.08⅛	.07⅞	.08⅛	.07½	.08⅛
Bisulfate powd, bbls, wks .....100 lb.	3.00	3.60	3.00	3.60	3.00	3.60
35° bbls., wks .....100 lb.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, kgs, wks c.l....lb.	...	.06½	...	.06¼	...	.06¼
Cyanide, 96-98%, wks ..lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, wks lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.08¼
Hyposulfite, cryst, bgs, cl, wks .....100 lb.	...	2.25	...	2.25	...	2.25
Metasilicate, gran, bbl, wks c-l .....lb.	...	2.50	...	2.50	...	2.50
Nitrate, imp, bgs .....ton	...	33.00	...	33.00	...	33.00
Nitrite, 96-98% bbl. cl. lb.	...	.06¾	...	.06¾	...	.06¾
Phosphate, di anhyd. bgs. wks. .....100 lb.	6.00	6.75	6.00	6.75	6.00	7.25
Tri-bgs, cryst, wks 100 lb.	2.70	3.10	2.70	3.10	2.70	3.45
Prussiate, yel, bbls. wks lb.	...	.11	...	.11	...	.11
Silicate, 52°, drs, wks 100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
40°, drs, wks, c-l 100 lb.	...	.80	...	.80	...	.80
Silicofluoride, bbls NY .lb.	.06½	.07½	.06½	.10	.06½	.10
Sulfate tech, Anhyd, bgs .....100 lb.	1.70	2.20	1.70	2.20	1.70	2.20
Sulfide, cryst c-l, bbls, wks .....100 lb.	...	2.40	...	2.40	...	2.40
Solid, bbls, wks .....lb.	3.15	3.90	3.15	3.90	3.15	3.90
Starch, Corn, Pearl, bgs .....100 lb.	...	4.08	...	4.08	...	4.08
Potato, bgs, cl .....lb.	...	.0637	...	.0637	...	.0637
Rice, bgs .....lb.	no stocks		no stocks		no stocks	
Sweet Potato, bgs .....lb.	no stocks		no stocks		no stocks	
Sulfur, crude, mines ....ton	...	16.00	...	16.00	...	16.00
Flour, USP, precp, bbls, kgs .....lb.	.18	.30	.18	.30	.18	.30
Roll, bbls .....100 lb.	2.40	2.90	2.40	2.90	2.40	2.90
Sulfur Dioxide, liquid, cyl lb.	.07	.08	.07	.08	.07	.09
tks, wks .....lb.	...	.04	...	.04	...	.04
Talc, crude, c-l, NY ....ton	...	13.00	...	13.00	...	13.00
Ref'd, c-l, NY .....ton	13.00	21.00	13.00	21.00	13.00	21.00
Tin, crystals, bbls, wks. ..lb.	no stocks		no stocks		no stocks	
Metal .....lb.	...	.52	...	.52	...	.52
Toluol, drs, wks .....gal.	...	.32	...	.32	...	.33
tks, frt all'd .....gal.	...	.27	...	.27	...	.28
Tributyl Phosphate, dms lcl, frt all'd .....lb.	...	.49	...	.49	...	.47
Trichloroethylene,dms,wks lb.	.08	.09	.08	.09	.08	.09
Tricresyl phosphate tks ...lb.	...	.24	...	.24	...	.24
Triethylene glycol, dms....lb.	.18½	.19½	.18½	.19½	.18½	.19½
Triphenyl Phos, bbls .....lb.	.31	.32	.26	.32	.26	.31
Urea, pure, cases .....lb.	...	.12	...	.12	...	.12
Wax, Bayberry, bgs .....lb.	no stocks		no stocks		no stocks	
Bees, bleached, cakes ..lb.	.68	.70	.60	.70	no-stocks	
Candelilla, bgs crude ..lb.	.74	.75	.62	.75	.35	.36
Carnauba No. 1, yellow, bgs, ton .....lb.	1.80	1.85	1.80	1.85	no stocks	
Xylol, Indus. frt all'd, tks, wks .....gal.	...	.26	...	.26	...	.27
Zinc Chloride tech fused, wks .....lb.	.05	.0535	.05	.0535	.05	.0535
Oxide, Amer, bgs, wks..lb.	.07¼	.07½	.07	.07½	.07	.07½
Sulfate, crys, bgs...100 lb.	3.40	4.15	3.40	4.15	3.40	4.15

OILS AND FATS

Babassu, tks, futures .....lb.	...	.111	...	.111	...	.111
Castor, No. 3, bbls .....lb.	.13¾	.15½	.13¾	.15½	.13¾	.14¼
China Wood, drs, spot NY lb.	.39	.41	.39	.41	.39	.41
Coconut, edible, drs NY...lb.	...	.0985	...	.0985	...	.0985
Cod Newfoundland, dms..gal.	.88	.90	.88	.90	.85	.90
Corn, crude, tks, wks ....lb.	...	.12¾	...	.12¾	...	.12¾
Linseed, Raw, dms, c-l ...lb.	...	.1550	...	.1550	...	.1550
Menhaden, tks .....lb.	...	.1225	...	.1225	...	.1225
Light, pressed, drs l.c.l lb.	...	.1300	...	.1300	...	.1300
Palm, Niger, dms .....lb.	...	.0865	...	.0865	...	.0865
Peanut, crude, tks, f.o.b. wks .....lb.	.12⅞	.13⅞	.12⅞	.13⅞	.12⅞	.13⅞
Perilla, crude dms, NY ..lb.	no stocks		no stocks		no stocks	
Rapeseed, New Orleans, bulks .....lb.	...	.13	...	.13	...	.156½
Red, dms .....lb.	.13¼	.14¼	.13¼	.14¼	.12¼	.14¼
Soy Bean, crude, tks, wks lb.	...	.1175	...	.1175	...	.1175
Tallow, acidless, bbls.....lb.	...	.14¼	...	.14¼	...	.14¼

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METHYL "CELLOSOLVE" STEARATE, a synthetic ester, is used as a plasticizer for cellulose derivative, paper coatings and wax finishes. The following data may suggest other uses.

Chemical formula, $C_{17}H_{35}COOCH_2CH_2OCH_3$
Molecular weight 342
Color (platinum cobalt scale) 175
Melting point ..... 22° to 24°C
Flash point ..... 378°F
Acidity, less than .6 mg. KOH per gram ester
Specific gravity ..... .888 at 25°/25°C
Iodine value ..... 2 max.

Low volatility

* Trade mark of C&CCC

★

BUTYL STEARATE

BUTYL STEARATE, a synthetic ester, is used as a plasticizer for cellulose and polyvinyl derivatives, also for cosmetics, paper coatings and wax finishes. The following data may suggest other uses.

Chemical formula ..... $C_{17}H_{35}COOC_4H_9$
Molecular weight 341
Color (platinum cobalt scale) 130
Melting point ..... 19° to 20°C
Flash point ..... 358°F
Acidity, less than .6 mg. KOH per gram ester
Saponication number, 171-179 mg. KOH per gram ester
Specific gravity ..... .85-.86 at 20°/20°C
Iodine value ..... 2 max.

Low volatility

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1 Devine Double Bronze Drum Dryer; 3′x9′ with 25 H.P. Motor
1 Buffalo Double Drum Dryer; 32″x72″
1 Buffalo Single Drumchrome plated Dryer; 5′x6′ with auxiliaries
2 Vacuum Drum Dryers; 48″x40″ (1 iron, other Bronze, chromed)
1 Buffalo Vacuum Drum Dryer, 5′x20′
1 Rotary Vacuum Dryer; 3′x18′ with auxiliaries
2 Galland & Henning Steam Tube Dryers; 6′x30′
1 Ruggles-Cole Rotary Dryer; 4′x20′ with auxiliaries
1 Proctor & Schwartz 3 Pass Apron Dryer; 41′ long
1 Ross 4 Pass Continuous Conveyor Dryer; 60′ long with accessories
3 Raymond IMP Mills No. 45 with accessories
1 Raymond IMP Mill 24″ with accessories
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1—COLTON #2 Rotary

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50—300 Gal. Pfaudler Glass-Lined Tanks, with cover, mounted on supports.

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1—55 Gal Blaw-Knox Stainless Steel Rotating, Jacketed, 750 lbs. Working Pressure with Reducer & Motor.

1—42" dia. x 24'-4" Vertical, Forge Welded Steel, 600 lbs. Pressure—1300 gals.

1—4' x 6' Vertical, Iron Body, Steel Jacketed, 200 lbs. Pressure—600 gals.

1—6' x 15' Vertical Steel, Jacketed, 125 lbs. Pressure—3400 gals.

1—10' x 25' Vertical or Horizontal, Forge Welded Steel, Jacketed, 100 lbs. Pressure.

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1—D.O. James—Size 1300 Vertical Worm Gear, Ratio 82 to 1, with base plate for 5 H.P. motor drive.

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1—All Copper Condenser, 1¼" Tubing, 300 sq. ft. Surface.

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4—4' x 24' x 2'6" Deep Stainless Clad Steel, Jacketed—1800 gals.

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1—4 ft. Dia. x 6 ft. long Steel Dryer. Inside lined with Sprayed Stainless Steel, Foote Bros. Reducer Drive.

3—Barlett & Snow Vertical Steel, Jacketed, 10' dia. x 4' high. Agitators, Reducers, 2 H.P. Motors.

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1—King & Gerber, 38" dia. with Bronze Basket.

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1—18' dia. — Cast Iron — with Dephlegmator — 15 sections, each 6" high — 2 top & bottom sections each 18½" high.

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1—4' dia. x 7' deep, open top, jacketed steel kettle, bottom outlet, no agitator or drive. 700 gals. capacity.

1—6'-9" dia. x 9'-0' deep, "Lehigh" Cast Iron Kettle with 2 Heating Coils, Agitator & Drive, 2500 gals. capacity.

1—6' dia. x 8' deep Steel Kettle with removable Head, 1600 gals. capacity.

MILLS

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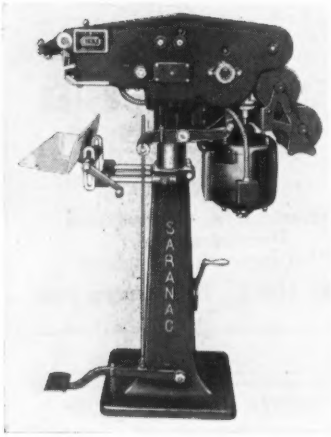

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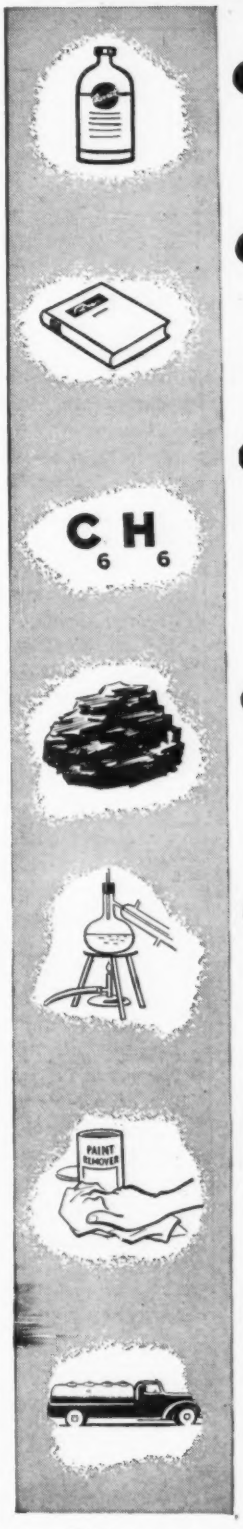
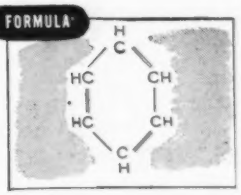
BENZOL



DEFINITION: Benzol (Benzene) is the parent hydrocarbon of the aromatic compounds. It is the basic raw material for the synthesis of many organic chemicals.

HISTORY: Discovered in 1825 by Faraday in an oil obtained by compressing illuminating gas. Hofmann found it in coal-tar in 1845. The process of recovering benzol industrially was first developed by Charles Mansfield.

FORMULA: C_6H_6



SOURCES: Benzol is obtained principally from the destructive distillation of coal. Most of the benzol produced in this operation is recovered by scrubbing coke-oven gas, while the balance is found in the portion of coal-tar that distills below 170°C.

CHARACTERISTICS: The pure product is a mobile, colorless liquid. It boils at 80.1°C., and crystallizes at 5.5°C. It is practically insoluble in water but mixes readily with ether, anhydrous alcohol, petroleum distillates and many organic liquids.

USES: A solvent for stains, coatings, and rubber cements; an essential raw material for the manufacture of dyes, tetryl and other explosives, synthetic rubber, phenol, aviation fuel, and D. D. T.

GRADES:

	Sp. Gr.	Boiling Range
Benzol, Nitration Pure	.882-.886	1°C max. incl. 80.1°C
Benzol, Industrial Pure	.875-.886	2°C max. incl. 80.1°C
Benzol, 90%	.870-.886	Start: Min. 78.2°C., 90% min. at 100°C
Thiophene-free Benzol	.882-.886	1°C max. incl. 80.1°C

This is one of a series of advertisements presenting information on basic coal-tar chemicals.

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"In 1939, an English chemist discovered penicillin. It might have stayed in the laboratories for years. But *The American Weekly* focussed the attention of the country on penicillin and spurred chemists and even brewers to speed up the manufacturing of this great life saver that ordinarily would have taken years to develop."

Surprised? So were we! Even at this late date, let us give credit where credit is due—a dinner, say, sponsored by the penicillin manufacturers and a Citation for Meritorious Service.

"Large-scale use in Germany of a new snythesis of acetone from acetone is reported by the U. S. Naval Technical Mission in Europe," we learn from a government release.

Quantitative yield?

One of our esteemed contemporary publications refers to Williams Haynes as "the author of *The Stone That Burks.*"

Don't you mean *The Stone That Burps?*

We were overjoyed to learn at the ACS meeting that mice fed on yeast nucleic acid live 8 to 9 per cent longer. In the spirit of whimsy, a plan unfolds in our mind to rid the world of these little nuisances: Feed them all yeast nucleic acid, let them overpopulate themselves, let the ratio of oldsters increase to the point where social security becomes a problem, and they will all beat their little heads against the wall rather than face the troubles which beset the human race.

We also learned that it is possible to make petroleum hydrocarbons by radioactive bombardment of fatty acids (with fats and oils so scarce yet!). Some years ago we had a plant to make aluminum by reacting star sapphires with diamonds in an electric furnace, but we didn't make any money on it.

In an attempt to bring the facts of nuclear chemistry within the grasp of the Common Man, *Life Magazine* made shift with the ordinary atomic models in a recent picture story.

Something better is needed, we think. We visualize electrons and positrons as being the same shape, with rather fuzzy outlines, but one is green and the other red. Neutrons are black, round, and shiny. We're not so sure about neutrinos, but we think they're pale mauve and spinning like mad.

Secretary of War Patterson related an anecdote at the ACS meeting which bears retelling.

The CWS developed a mortar which proved so effective that one mortar battalion, though classed as "service" troops, spent 450 days in line, supporting combat divisions. Whenever talk of relief came up, these mortarmen dug in deeper and wisecracked: "Relief? Hell, we're part of the terrain!"

Most of us heard rumors to the effect that the Germans had a new gas against which our masks would prove ineffective. Said Patterson: "The truth is that the mask furnished every American fighting man insured protection against any gas found in Germany."

It is true, Patterson confirmed, that the Japanese were experimenting with biological warfare—preparing to loose deadly bacteria, fungi, and the like on us. "It is fortunate that the enemy so respected our retaliatory potential that we were spared the horrors of this type of warfare."

Since we're on the subject of Germans and Japanese, here's an anecdote related by R. Lindley Murray:

"One of the top men in the German chemical industry told us this one. I can't prove it. He said that after Japan entered the war as an ally of Germany, the Germans sent their U-boats to the Pacific to be loaded up with natural rubber which they so badly needed. A deal was said to have been worked out whereby the Germans sent their U-boats to the Pacific icals to Japan by U-boat which would then be loaded up with natural rubber for the return trip to Germany. Because of war restrictions and shortages of textiles the Germans had built up huge stocks of synthetic indigo, which they were very anxious to move. The Japs had no real need for this indigo but U-boat after U-boat was said to have gone to Japan loaded down with it, and each returned to Germany with a load of priceless natural rubber. All of which may or may not prove that the Germans were just as good business men as they were chemists."

FIFTEEN YEARS AGO

(From our files of May, 1931)

Aside from the presentation of technical papers the most important feature of the American Chemical Society meeting at Indianapolis last month was the report of the committee on industrial alcohol regulations. These were assailed in no uncertain terms.

At a recent A. C. S. meeting Robert T. Baldwin was unanimously elected Treasurer of the American Chemical Society to fill the unexpired term of the late Dr. John E. Teeple.

Secretary of Treasury Mellon has found that there is no justification for issuance of a dumping order against importation of salt cake from Germany. Complaint was made against imports of salt cake produced in Germany by the Sodium Products Corp. and Myles Salt Company.

Agreement for the licensing of "cracking" patents in the manufacture of gasoline were held by the United States Supreme Court not to have resulted in monopoly or restriction of competition. The important decision marked the failure of the Government to substantiate its charges that the Standard Oil Co. of Indiana and forty-nine other corporations are restraining trade and attempting to monopolize commerce in gasoline through the use of patents for "cracking" petroleum to produce gasoline.

At an organization meeting of directors of Atlas Powder held in Wilmington, Isaac Fogg and W. T. Penniman were elected vice presidents.

THIRTY YEARS AGO

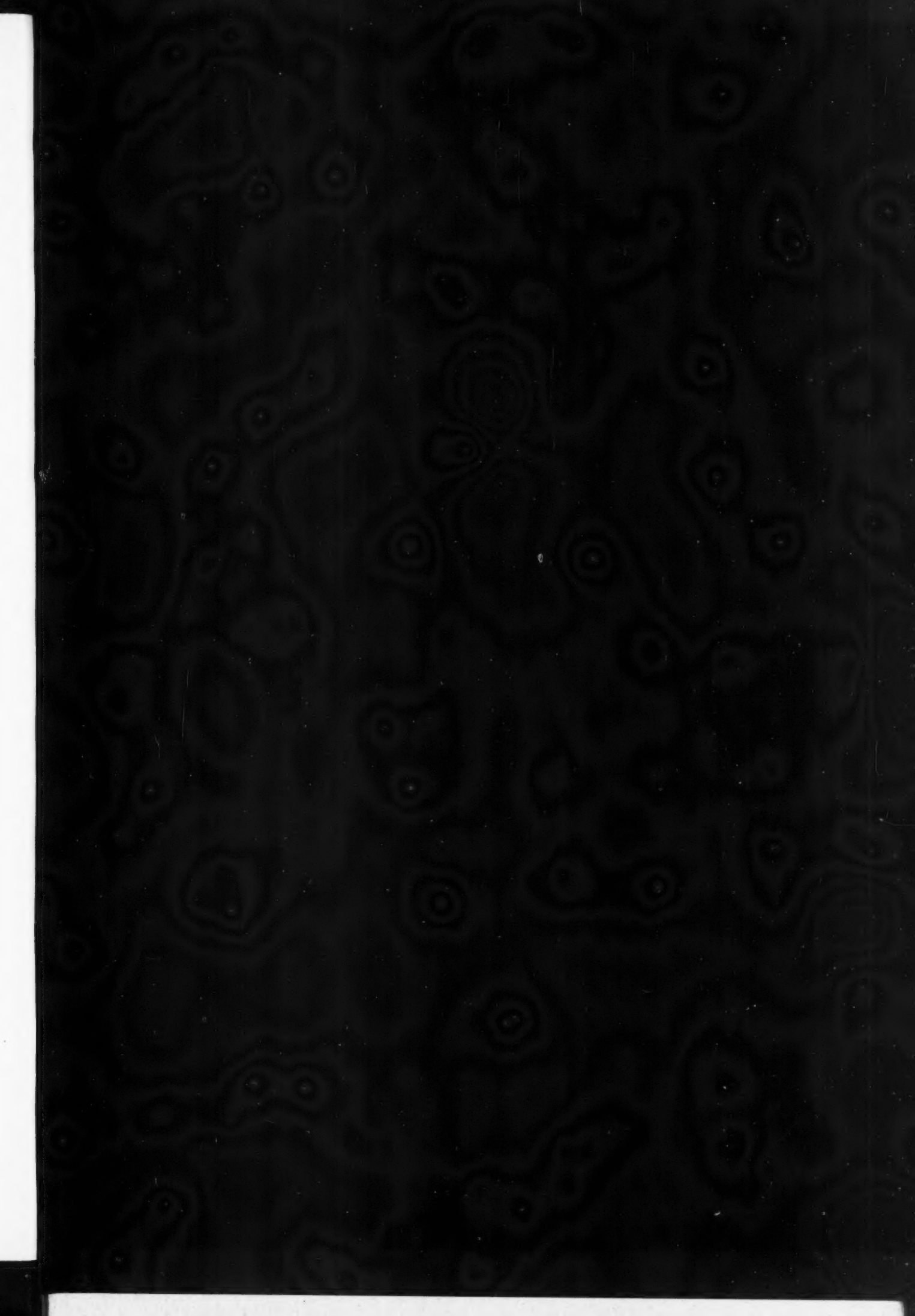
(From our files of May, 1916)

Senate passes the Knox dyestuff amendment for emergency protection to the infant dye industry.

The 1920 presentation of the Nichols Medal is made to Dr. Gilbert N. Lewis of the University of California by Dr. John E. Teeple.

Director of the Aetna Explosives plan a merger with the Hercules Powder Co.

The Monsanto Chemical Works increases the common stock of the company from $700,000 to $3,500,000.



PATENTS AND TRADEMARKS

Abstracts of U. S. Chemical Patents

A Complete Checklist Covering Chemical Products and Processes

Printed copies of patents are available from the Patent Office at 10 cents each. Address the Commissioner of Patents, Washington, D. C., for copies and for general information concerning patents or trade-marks.

From Official Gazette—Vol. 582, Nos. 4, 5—Vol. 583, Nos. 1, 2 (Jan. 22-Feb. 12)—p. 663

*Organic

Hydroxy-benzoate of a hydroxy-phenone. No. 2,392,361. Edgar Britton and Ezra Monroe to The Dow Chemical Co.

Reaction products of aldehydes and triazine derivatives. No. 2,392,366. Gaetano D'Alelio and James Underwood to General Electric Co.

Production of toluol from naphthenic straight run gasolines via catalytic dehydrogenation, method of producing increased yields of pure toluol while realizing maximum catalytic efficiency. No. 2,392,398. Frank McMillan and George Liedholm to Shell Development Co.

Production of oxygenated acyclic terpene which comprises reacting acyclic terpene having three double bonds per molecule with water and gas containing free oxygen as sole reactive gas. No. 2,392,413. Alfred Rummelsburg to Hercules Powder Co.

Production of quinolinic acid comprising oxidizing product of reaction between quinoline and concentrated sulfuric acid, with manganese dioxide. No. 2,392,437. Jacob van de Kamp and Meyer Sletzinger to Merck & Co. Inc.

Direct production of styrene from benzene and ethylene. No. 2,392,466. William Denton and Carleton Schlesman to Socony-Vacuum Oil Co. Inc.

Salt of an N-monochloro-5,5-dialkyl hydantoin and metal below alkali metals in electromotive series of elements. No. 2,392,505. Arthur Rogers to E. I du Pont de Nemours & Co.

Purifying and separating mixture of secondary alcohols including isopropyl, secondary butyl alcohols and higher alcohols obtained from industrial gas mixtures containing propylene and butylene by conversion of olefins into alcohols. No. 2,392,534. Otto von Keussler.

Manufacture of mercaptans. No. 2,392,554. Walter Schulze to Phillips Petroleum Co.

Production of high-boiling mercaptans comprising mercaptans having branched carbon skeleton and having mercaptan group attached to tertiary carbon atom. No. 2,392,555. Walter Schulze to Phillips Petroleum Co.

Recovering glycerin from concentrated distillery slop which comprises subjecting liquid slop to counter-current extraction with aqueous acetone. No. 2,392,569. Frederick Balcar to U. S. Industrial Chemicals, Inc.

Preparing alpha,beta-diaryl ethanes. No. 2,392,595. Morris Knarasch to Eli Lilly and Co.

Preparing mono-aryl melamines which comprises causing to react 1,3-dicyanoguanidine and a primary aryl amine at a pH of less than about 1. No. 2,392,607. Daniel Nagy to American Cyanamid Co.

Preparing N_1-di-substituted melamines which comprises reacting a secondary amine and 1,3-dicyanoguanidine. No. 2,392,608. Daniel Nagy to American Cyanamid Co.

Producing carbon bisulphide which comprises producing fluid sulphur composition containing sulphur and a viscosity inhibiting agents, etc. No. 2,392,629. Julian Avery and Leroy Marek to Arthur D. Little, Inc.

Triazine derivatives. No. 2,392,649. Gaetano D'Alelio and James Underwood to General Electric Co.

Reclaiming dimethyl silicone elastomer which comprises treating elastomer with a dimethyldihalogenosilane. No. 2,392,713. James Wright and Curtis Oliver to General Electric Co.

Separating gaseous olefins from gaseous paraffins which comprises contacting gas mixture of two with solution of iodine in solvent for aliphatic hydrocarbons, etc. No. 2,392,739. Joseph Horeczy and Edward Wadley to Standard Oil Development Co.

Separation of propylene from ethylene which comprises contacting gas containing two with solution of iodine in solvent under conditions of temperature and pressure more favorable for formation of propylene iodine than for ethylene iodide, etc. No. 2,392,740. Joseph Horeczy and Edward Wadley to Standard Oil Development Co.

Obtaining high yields of pure aromatic hydrocarbons of type of benzene, toluene and mixed xylenes from petroleum fraction. No. 2,392,749. Elton Lewis and Chester Read to Standard Catalytic Co.

Catalytic dehydrogenation of hydrocarbons containing four carbon atoms and selected from mono-olefins and alkylated aryl compounds, which comprises passing hydrocarbons admixed with steam over satalyst containing zirconium oxide, Fe_2O_3, oxide of a metal of right-hand side of groups I, II, and III of periodic system, and potassium oxide. No. 2,392,750. Norman Linn to Standard Oil Development Co.

Contacting organic fluid with a Friedel-Crafts type metal halide sludge. No. 2,392,798. Louis Kleiss to Phillips Petroleum Co.

4.6 diacetoxymercuri-5-nitro guaiacol. No. 2,392,801. Edgar Peterson, deceased, by John Cochran, administrator, to Lynch & Co.

Monoazo tetrahydroquinoline compounds. No. 2,391,886. Joseph Dickey and James McNally to Eastman Kodak Co.

Trans-6,7-trans-11,12-tetracarbomethoxy-8(14), 9-chrysitadiene. No. 2,391,943. Lewis Butz to Secretary of Agriculture of the United States of America.

2-Thiocyanothiazolines. No. 2,391,993. Roger Mathes to The B. F. Goodrich Co.

Producing halo-alkoxy compounds which comprises introducing halogen from chlorine and bromine into mixture of compound selected from unsaturated aliphatic monocarboxylic acids and esters and amides thereof and a hydroxy compound selected from primary and secondary aliphatic

* *Continued from Vol. 581, No. 4, Vol. 582, No. 1, 2, 3.*
(Continued on page 891)

Patents Available for License or Sale

The Patent Office is regularly publishing a Register of Patents Available for Licensing or Sale. Patents concerning chemical products and processes appear below.

Alien Property Custodian James E. Markham has announced that the second and final supplement to the abstracts of vested chemical patents is now available.

Mr. Markham said the supplement contains abstracts of about 800 patents and patent applications vested since publication of the first supplement in 1945.

The abstracts are grouped into 31 fields, Mr. Markham explained, ranging from heavy chemicals, drugs, foods, unit processes and ceramics, to plastics, pulp and paper, rubber and petroleum.

Both the first and the second supplements may be purchased from the Office of Alien Property Custodian, Chicago 3, Illinois, for one dollar each. The set of original abstracts, covering about 8,000 patents in the chemical field, may be obtained for $25.00 from that office.

March 19, 1946

Pat. 2,019,502. **Closure Operator.** Patented Nov. 5, 1935. Pneumatically-operated motor controls flow of coal, etc., from chute into receptacle. Arranged beneath discharge end of chute in space between mine track and mine wall. Held in position by elongated link member pivotally connected to end of chute and to power actuating elements. Group 35—33. Reg. No. 2,418.

Pat. 2,258,614. **Method of Treating and Producing Oil-Water Wells.** Patented Oct. 14, 1941. 32 claims. Several methods are claimed among which is treating an oil-water well by forcing the water in the well down the latter by introducing upon the top of any liquid column in the well a quantity of oil sufficient, when confined in a column of the cross section of the liquid column, to exert a pressure at the bottom of the well exceeding the bottom hole pressure. Group 35—32. Reg. No. 2,423.

Pat. 2,258,615. **Apparatus for the Treatment and Producing of Oil-Water Wells.** Patented Oct. 14, 1941. 11 claims. Provides means for mechanically pumping well, for introducing into such well a quantity of fluid of lighter specific gravity than mixture in well, and building up a gaseous formation pressure upon the top of the fluid so introduced to force liquid in well back into the oil stratum. Several other adaptations recited. Group 35—32. Reg. No. 2,424.

Pat. 2,258,616. **Treatment and Producing of Oil Wells.** Patented Oct. 14, 1941. 21 claims. Includes restoring to availability for oil delivery the portions of formation which have become water sealed, by forcing the water standing in the well down to such a position that there will be reduced interference to entry of oil into well, then plugging off bottom of well. Several other methods are claimed. Group 35—32. Reg. No. 2,425.

The four patents listed above are owned by the Sullivan Machinery Company. Address correspondence to Louis A. Maxson, Patent Department, Sullivan Machinery Company, Claremont, N. H.

Pat. 2,265,674. **Fluid Dispenser.** Patented Dec. 9, 1941. A fluid holding container is fitted with a stopper into which two tubes have been inserted, one functioning as a siphon, the other as an air duct. When container is inverted, fluid may be discharged into a receptacle wherein the tubes terminate. When level of fluid reaches mouth of air duct, flow of liquid stops. One modification has the appearance of a syringe, the ducts and stopper being formed integrally. When used to supply water to storage batteries, fluid is drawn into bulb in usual manner of a syringe. To discharge, bulb is squeezed to start the siphon. A gauge bar on stem controls depth to which stem may be inserted. (Co-owner) Arthur E. Spencer, 2050 Leavenworth St., San Francisco, Calif. Groups 30—51; 32—21; 40. Reg. No. 2,428.

Pat. 2,028,670. **Reenforced Light-Transmitting Sheet.** Patented Jan. 21, 1936. Suitable woven wire mesh screen has a sheet of transparent flexible material applied flatwise to each side, being cemented thereto at the high spots only of the wire meshes. Modified form shows a flattened sheet. Individual window elements between the meshes are not distorted but remain parallel with each other. Finished sheet presents no opaque areas at cemented joints to obstruct vision. (Owner) Richard T. Hosking, 818 Park Ave., Wilmette, Ill. Groups 25—61; 33—49. Reg. No. 2,435.

March 26, 1946

Pat. 1,924,518. **Method of Producing Insecticides.** Patented

(Continued on following page)

(Continued from preceding page)

Aug. 29, 1933. The preparation of calcium arsenate by the reaction of calcium oxide and arsenious oxide, either of which may be in form of a vapor or dust, at temperatures between 800 degrees and 1000 degrees centigrade in the presence of oxygen. Barium, magnesium, and lead arsenate may be prepared in a similar manner. (Owner) Eugene R. Rushton, P. O. Box 556, Florence, Ala. Group 28—33. Reg. No. 2,463.

Pat. 2,318,952. **Sanitary Waste Pail Lining.** Patented May 11, 1943. Bellows-like collapsible lining is made of waterproof material (Cellophane, wax paper, or the like). Bottom and rim are of heavier construction. The rim is designed to fit over rim of pail. (Owner) Carl L. Martin, 923 Maple Ave., Rome, Ga. Groups 26—32—39; 28—83. Reg. No. 2,464.

Pat. 2,115,247. **Valve.** Patented Apr. 26, 1938. A rotary disk valve designed for use in a pipeline handling a fluid suspension of coarse solids such as low density paper pulp. The registering openings in the valve disc and valve seat are as large as the pipeline itself. The hollow valve stem is journaled on a spindle which secures the valve seat to the valve body. The valve disc is pressed against the valve seat by a compression spring located between the outer end of the valve stem and an adjustable stop on the spindle. Solids may be dislodged from between the valve disc and its seat by exerting an axial pull on the valve stem. (Owner) Marvin D. Bellinger, P. O. Box 96, Brownville, N. Y. Groups 30—31; 33—66; 36—19. Reg. No. 2,465.

Pat. 2,366,563. **Method of Finishing Paper.** Patented Jan. 2, 1945. Process includes suddenly reducing the temperature of the paper after it comes from the calender to approximately room temperature without substantially altering its moisture content. Water-cooled rolls contact both surfaces of the paper. Prevents distortion or warping of the paper due to uneven cooling. (Owner) Van L. Shaw, 6140 Cottage Grove Ave., Chicago, Ill. Groups 26—99; 35—54. Reg. No. 2,471.

April 2, 1946

Pat. 2,264,267. **Weighing Apparatus for the Addition of Different Products of Variable Bulk and in Given Proportions.** Patented Nov. 25, 1941. Separate reading and calculation of weight is unnecessary in the instance of adding a proportion of brine to hams of varying sizes. Taring is obtained by means of a supplementary counterweight (or tare) which is always placed at one point, and removed so that brine can be injected until equilibrium is reestablished, indicated by an adjusting needle. All mechanism is placed above weighing tray to prevent corrosion. (Owner) Pierre Rabilloud. Address correspondence to Glascock, Downing & Seebold, National Press Bldg., Fourteenth and F. Sts., N.W., Washington, D. C. Groups 33—73; 35—43—74. Reg. No. 2,480.

Pat. 2,331,078. **Paste Tube Closure Means.** Patented Oct. 5, 1943. For dispensing fluid or semi-fluid material. Closure opens automatically upon application of pressure and upon release of pressure closes to shut off flow of material. Comprises flexible co-acting jaws which overlie and press against side of discharge slit. Automatically separated upon application of pressure to sides of closure element. (Owner) Clyde J. Peak, 508 Larkin St., San Francisco, Calif. Groups 34—92; 40. Reg. No. 2,508.

Pat. 2,106,410. **Ceramic Composition.** Patented Jan. 25, 1938. A ceramic composition for glazed tile, pottery, and other wares, in which a special glazing composition is applied to the unfired bisque body, and the article completed by a single firing process. (Owner) Anna Malinovszky, 2759 Santa Ana St., South Gate, Calif. Group 32—53—69. Reg. No. 2,517.

Pat. 1,911,410. **Method of Sealing Container Under Predetermined Pressures.** Patented May 30, 1933. For sealing electric light bulbs, radio tubes, etc., with operating structure assembled therein, whereby any desired pressure may be created and maintained within the container. Consists of tube having capillary duct into which cement heated to plastic stage is drawn where it hardens and seals duct. (Owner) Robert Valverde, Valverde Laboratories, 252 Lafayette St., New York, N. Y. Groups 32—29; 36—51—61. Reg. No. 2,437.

Pat. 2,205,807. **Plant Growth Stimulant.** Patented June 25, 1940. A composition, readily soluble in water, which acts to regulate, accelerate or promote the growth of plants, heal the wounds of and facilitate the root growth of cuttings, etc. Inventor states his composition more effective than thiamin or biotin in combination and capable of being produced at lower cost. Several examples given in patent. Group 28—71. Reg. No. 2,439.

Pat. 2,261,748. **Chlorinated Hydrocarbon Resin.** Patented Nov. 4, 1941. Groups 28—11—83; 29—99. Reg. No. 2,440.

Pat. 2,261,759. **Resinous Composition and Method of Preparation.** Patented Nov. 4, 1941. Groups 28—11—83; 29—99. Reg. No. 2,441.

Pat. 2,366,813. **Resinous Substances and Process of Preparation.** Patented Jan. 9, 1945. Groups 28—11—83; 29—99. Reg. No. 2,442.

The three patents listed above are methods for the preparation of varnishes, lacquers, and resins from various inexpensive hydrocarbon materials which dry to a hard finish when exposed to air and which adhere well to glass, metal, or other like surfaces. According to the inventors, the process of manufacture is simplified and does not involve the step of separating or removing any heavy oil or soft resin from the resultant products. Several examples are given, some of which act to protect the painted surface of wood, etc., against mold and vermin.

Pat. 2,261,758. **Impregnated Porous Article.** Patented Nov. 4, 1941. The treatment of wood, fiber board, cork, and other porous materials which may be impregnated with a preserving agent, obtained from hydrocarbon oils, to render them resistant to humid condition, termites and fungi and, in addition, permits the application of paint (not entirely possible with materials treated with creosote or zinc chloride). Groups 25—94; 28—83; 29—99. Reg. No. 2,443.

Pat. 2,332,196. **Friction Reducing Surface Coating.** Patented Oct. 19, 1943. Graphite incorporated into surface coating of an airplane, ship, or projectile tends to reduce the friction between the vehicle and the media through which it is moving, thus making greater speed possible with unchanged power consumption. Examples cited. Groups 28—11; 32—97. Reg. No. 2,444.

Pat. 2,389,292. **Preparation of Protein Compositions and Masses Having Improved Physical Characteristics.** Patented Nov. 20, 1945. The addition of a plasticizer (glycerin, glucose) while enhancing resiliency of a protein gel (gluten, gelatin, glue) lowers its melting point; a tanning agent (formaldehyde, tannic acid) raises the melting point, but diminishes resiliency. However, a plasticized sheet of gelatin, or the like, subjected to a rhythmical stretching and relaxing action while under the influence of a tanning agent retains a high melting point and results in an elastic sheet of greater tensile strength. Applicable to hectograph blankets, woven fabrics, or other compositions. Details given in patent. Groups 28—51—83—94; 35—55. Reg. No. 2,445.

The seven patents listed above are owned or controlled by Johan Bjorksten, Ph.D., 185 North Wabash Ave., Chicago 1, Ill.

April 9, 1946

Pat. 2,363,474. **Liquid Dispenser.** Patented Nov. 21, 1944. Medicine dropper type permits delivery of liquids or acids without exposure of contents to air and limited exposure to stopper material. Resilient, removable diaphragm closes charging end and a removable stand or base encloses and seals discharge end, which also supports dispenser in upright position. (Owner) Eagle Chemical Co., 262 Fifth Ave., New York, N. Y. Group 39—16—17. Reg. No. 2,524.

Re. 21,779. **Neutralization of Acids Exuding from Silicious Cements.** Patented Apr. 22, 1941. Original No. 2,154,413, dated Apr. 11, 1939. Process for the neutralization of acids in dentistry. Consist of alkalizing the interior surface of the cavity with an absorbable liquid alkali prior to filling to prevent injury to live pulp and applying an exterior alkaline medium to the filling. Neutralizes any free acids which may exude from the filling while in the process of cementation. (Owner) Eagle Chemical Co., 262 Fifth Ave., New York, N. Y. Group 39—17. Reg. No. 2,525.

Pat. 2,086,322. **System of Mineral Treatment for Recovering Rare Metals.** Patented July 6, 1937. Reg. No. 2,554.

Pat. 2,138,313. **Riffle Block.** Patented Nov. 29, 1938. Reg. No. 2,555.

The two patents listed above relate to an apparatus and system particularly adapted for placer mining wherein, the rarer metals such as iridium, palladium, ruthenium, and osmiridium are recovered. Material is diverted from sluiceway according to size and subjected to special treatment. Water and minerals remaining after each treatment are always diverted back into flow in main sluiceway. Mercury positioned in specially designed grooves in riffle blocks is continuously agitated by flow of material thereover to break up surface film and clean the mercury. Minerals which are coated or contain metals not easily amalgamated are electrically charged. Porous layers of material such as moss are provided to recover fine particles not previously or otherwise recovered. Group 35—33.

April 16, 1946

Pat. 2,370,751. **Fluid Flow Control Means.** Patented Mar. 6, 1945. Closure means and controls for large valves, sluice gates and the like. Controlled static fluid pressure is applied to an annular, flexible diaphragm and transmitted to an annular sealing pad of relatively soft material associated with metal rings to gradually reciprocate the pad to either seat against the gate after it has been lowered or break contact before gate is raised, thereby avoiding friction, adhesion or abrasion of the pad. The sealing means do not obstruct the flow of fluid through the bore being located flush with bore in an outside chamber. Pressure is admitted through an auxiliary conduit and spring means tend to hold seal in open position. (Owner) Frank D. Prager, 6934 Crandon Ave., Chicago 49, Ill. Group 35—33. Reg. No. 2,584.

Pat. 2,275,915. **Dispensing Apparatus.** Patented Mar. 10, 1942. Detachable nozzle for dispensers, particularly useful when adding water to batteries, automatically cuts off supply when proper level is reached. Mouth is slotted so that when water level reaches upper ends of the slots, entry of air is blocked and supply cut off. Nozzle is provided with a valve. (Owner) Donald B. McDonald, P. O. Box 550, Quitman, Ga. Groups 35—61; 40. Reg. No. 2,590.

Pat. 2,390,724. **Bottle Closure Retainer.** Patented Dec. 11, 1945. Fits over neck and mouth of bottle and secured over stopper. Pivoted arms just above head of bottle neck carry half-collar clamping elements, which grip and form ring around neck below bead. A padlock prevents opening of device. (Owner) Wilburt W. Mays, 2226 North Camac St., Philadelphia 33, Pa. Group 33—73. Reg. No. 2,593.

Pat. 2,312,312. **Evaporator.** Patented Mar. 2, 1943. Reg. No. 2,594.

Pat. 2,312,313. **Evaporator.** Patented Mar. 2, 1943. Reg. No. 2,595.

The two patents listed above relate to evaporators designed to operate at sub-atmospheric pressures in which the heat exchangers are enclosed within a single cylindrical shell and the tubes carrying the heat delivering fluid are submerged in a liquid refrigerant of low pressure range (Freon-11, etc.), held within an open trough mounted within the shell. The space between the trough and the shell provides an elongated offtake so that a uniform pressure is maintained over the vapor disengaging surface of the trough. The absence of localized low pressure areas prevents surging and spouting. Pat. #2,312,313 differs chiefly in the presence of a secondary heat exchanger in the offtake. (Owner) Walter E. Beline, 103 Beach Ave., Larchmont, N. Y. Group 35—51.

Pat. 2,352,069. **Distilling Apparatus.** Patented June 20, 1944. Distilling and condensing units are combined into a single, compact tank so that pure liquid is produced automatically and continuously from impure or contaminated liquid. Incoming liquid used to condense vapor becomes preheated so that it may be readily introduced into the distilling unit for vaporization. (Co-owner) Walter E. Beline, 103 Beach Ave., Larchmont, N. Y. Group 35—51. Reg. No. 2,596.

(Continued on following page)

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The three patents listed above are available for license or sale at reasonable terms, exclusively and outside the field of refrigerations.

Pat. 1,990,340. **Visible Multiple Fuse.** Patented Feb. 5, 1935. Low cost, light weight, molded plastic construction. Rotatable member brings blown fuse into view through mica window, making it simple to reset for re-use without removing fuse. (Owner) Albert J. Matter, 1026 North Hamlin Ave., Park Ridge, Ill. Groups 28—24; 36—19. Reg. No. 2,598.

Pat. 2,296,861. **Glue Applicator.** Patented Sept. 29, 1942. Comprises a tank with a plurality of aligned nozzles at the bottom with cup-shaped nipples or discs of elastic material having self-closing slits positioned on ends of nozzles. A plurality of plungers attached to a rocker shaft and operating lever are adapted to enter nozzles and force measured quantities of glue from the tank through the slits directly onto the object to be glued, or onto rotating wipers or rolls for transfer to the object. Plungers are adjustable to deliver various amounts and one or more of the plungers may be quickly rendered inoperative without affecting operation of the remaining plungers or plunger. (Licenses will be granted on this patent in any field except wrapping machines for cylindrical articles.) (Owner) Albert J. Matter, 1026 North Hamlin Ave., Park Ridge, Ill. Groups 33—73; 40. Reg. No. 2,599.

(*Continued from page 889*)

alcohols. No. 2,392,100. Donald Price and Richard Griffith to National Oil Products Co.

Catalyst selectively promoting direct amination of olefine in presence of ammonia which comprises metallic cobalt deposited on a cobalt silicate carrier. No. 2,392,107. John Teter to Sinclair Refining Co.

Dehydroxylating glyceride oils, which coprises introducing oil into lower end of inclined space of such shape that the oil is in thin layer, and applying heat to oil to vaporize it. No. 2,392,119. Ivor Colbeth to The Baker Castor Oil Co.

Separating p,p' dihydroxy diphenyl sulphone from mixtures containing p,p' dihydroxy diphenyl sulphone and o,p' dihydroxy diphenyl sulphone. No. 2,392,137. Scott Foster to Monsato Chemical Co.

Separating close-boiling mixtures of aliphatic C_4 to C_6 hydrocarbons having similar boiling points and of varying degrees of saturation, which comprises contacting mixture in gaseous state with liquid solvent selected from levulinic acid and lower aliphatic alkyl esters of levulinic acid. No. 2,392,277. Charles Welling to Phillips Petroleum Co.

Butane is isomerized by passage in admixture with hydrogen chloride through reaction zone containing isomerization catalyst, etc. No. 2,392,284. William Gage to Shell Development Co.

Producing styrene. No. 2,392,289. Campbell McCullough and Willard Gehrke to Monsanto Chemical Co.

Photochemical preparation of thio-ethers. No. 2,392,294. Frederick Rust and William Vaughan to Shell Development Co.

Photochemical production of halogenated thio-ethers. No. 2,392,295. Frederick Rust and William Vaughan to Shell Development Co.

Latex free of fixed alkali containing 0.1% to 10% of di-(p-hydroxyphenyl)-1,1-cyclohexane, said latex being thickened by the zinc-ammonia complex. No. 2,392,825. Duncan MacLeod to General Latex and Chemical Corp.

Reaction products of aldehydes and diazine derivatives. No. 2,392,837. Gaetano D'Alelio and James Underwood to General Electric Co.

Preparing sulphon chlorides by reacting member of group of sulphuryl chloride and mixture of chlorine and sulphur dioxide with organic compounds devoid of phosphorus, improvement which comprises carrying out reaction in presence of compound of group consisting of organic phosphonic acids, organic thiophosphonic acids, etc. No. 2,392,841. Stanley Detrick and Lyle Hamilton to E. I. du Pont de Nemours & Co.

Preparation of pure nitroguanidine. No. 2,392,860. Frank Miles and Harry Jackson to Imperial Chemical Industries Ltd.

Manufacture of phenol by vapor phase oxidation of benzene, which comprises passing mixture comprising benzene vapor and oxygen through three unit system. No. 2,392,875. Frank Porter to The Solvay Process Co.

Refining styrene admixed with impurities including phenyl acetylene and organic color-imparting material normally present in a light oil styrene fraction. No. 2,392,910. Raymond Franz to The United Gas Improvement Co.

Producing isobutane which comprises subjecting normal butane to action of stannic chloride. No. 2,392,924. Vladimir Ipatieff and Herman Pines to Universal Oil Products Co.

Purification of mercaptothiazoles. No. 2,392,935. Roger Mathes to The B. F. Goodrich Co.

Producing butadiene which comprises subjecting 2,3-butylene glycol diacetate to action of a copper phosphate catalyst. No. 2,391,508. Herman Pines and Vladimir Ipatieff to Universal Oil Products Co.

Producing butadiene which comprises subjecting 2,3-butylene glycol diacetate to action of magnesium silicate catalyst. No. 2,391,509. Herman Pines and Vladimir Ipatieff to Universal Oil Products Co.

Metallation of beta keto esters. No. 2,391,530. Vernon Wallingford and August Homeyer to Mallinckrodt Chemical Works.

Separating and recovering pure carbon disulphide from vapor stream evolved from carbon disulphide retort and including hydrogen sulphide and sulphur, including utilization of a first and a second rectifying column. No. 2,391,541. Arnold Belchetz to Stauffer Chemical Co.

Producing diolefins. No. 2,391,555. Martin de Simo and Robert Roberts to Shell Development Co.

Dehydrogenation of normal aliphatic olefins to produce diolefins which comprises passing olefins in admixture with inert diluent into contact with catalyst comprising bauxite impregnated with nagnesium oxide and barium hydroxide. No. 2,391,646. Walter Schulze, John Hillyer and Harry Drennan to Phillips Petroleum Co.

Preparing conjugated diolefin by pyrolysis of alkanols. No. 2,391,667. James Amos and Frederick Soderquist to The Dow Chemical Co.

Halogenated organic compound which by its halogen content tends to corrode metallic bodies, said halogenated compound containing inhibitor selected from maleic anhydride and substituted derivatives of maleic anhydride. No. 2,391,689. Lawson Egerton to Bell Telephone Laboratories, Inc.

Purification of naphthenic acids by solvent extraction. No. 2,391,729. Wilmer McCorquodale, Jr. to Sun Oil Co.

Controlled oxidation of organic compounds to produce oxygenated compounds having same number of carbon atoms per molecule as starting organic compound, step of subjecting hydrocarbon to action of oxygen in presence of hydrogen bromide and bromide of a straight-chain paraffinic hydrocarbon. No. 2,391,740. John Raley and Frederick Rust to Shell Development Co.

Making 2-chloropyrazine which comprises reacting in vapor state mixture of chlorine and pyrazine in presence of water vapor. No. 2,391,745. John Sayward to American Cyanamid Co.

Manufacture of a hydantoin which comprises preparing non-alkaline rixture of hydrocyanic acid and a carbonyl compound having formula described in patent. No. 2,391,799. Arthur Rogers to E. I. du Pont de Nemours & Co.

Ethers of primary nitroalkanes and method of preparing them. No. 2,391,815. Carl Bahner.

Converting 4-methyl, alpha-methyl styrene to p-methyl styrene in vapor phase, steps of vaporizing 4-methyl, alpha-methyl styrene, preheating vaporized material to 300-500° C. and passing preheated vapors over a siliceous catalyst. No. 2,391,821. James Dixon to American Cyanamid Co.

Dehalogenating chloro-2-aminopyrimidine to corresponding 2-amino-pyrimidine which comprises subjecting chloro-2-aminopyrimidine to metallic zinc under alkaline conditions in presence of a salt of a metal selected from bismuth and tin. No. 2,391,822. Michael Dvornikoff to Monsanto Chemical Co.

Production of chloroprene which comprises subjecting vapors of substance selected from 2,3-dichlorbutene-1, 1,2-dichlorbutene-2, 1,3-dichlorobutene-2, and 3,3-dichlorbutene-1 to thermal dehydrochlorination in absence of basic agent and catalyst. No. 2,391,827. George Hearne and Merrill Adams to Shell Development Co.

Cationic active compounds. No. 2,391,831. David Jayne, Jr. and Harold Day to American Cyanamid Co.

Producing alkylated rosin compound which comprises alkylated, in presence of activated hydrosilicate catalyst, a rosin compound selected from rosin, hydrogenated rosin, dehydrogenated rosin, etc., with compound capable of alkylating rosin compounds. No. 2,392,945. Donald Price to National Oil Products Co.

Production of resin alcohols which comprises heating natural resinous substance containing carboxylic group in presence of hydrogen and of a hydrogenation catalyst. No. 2,392,952. Otto Schmidt to General Aniline & Film Corp.

Cyclic production of styrene from a butane-butene-butadiene fraction obtained by cracking of petroleum hydrocarbons. No. 2,392,960. Claude Watson to The Texas Co.

Amyl-beta-benzyloxypropionate, the phenyl group of which is linked to oxy group through methylene group of benzyl radical. No. 2,392,973. Benjamin Clayton to Rfining, Unincorp.

Producing a beta alkoxy propionyl compound by means of ether exchange. No. 2,393,000. Nelson Seeger to Wingfoot Corp.

Isomerizing normal pentene to isopentane wherein normal pentane vapors in admixture with added isobutane are contacted with catalyst comprising aluminum chloride in combination with adsorptive alumina whereby catalyst declines in activity as operation proceeds. No. 2,393,051. Frank McMillan and Harry Cheney to Shell Development Co.

7-hydroxy-cholesterol-7-acid phthalate-3-benzoate. No. 2,393,067. Hans Rosenberg and Daniel Terry to E. I. du Pont de Nemours & Co.

Producing 7-hydroxy-cholesterol-7-monobenzoate which comprises heating 3-trityl ether of 7-hydroxy-cholesterol-7-benzoate in presence of glacial acetic acid. No. 2,393,075. Stockton Turnbull, Jr. to E. I. du Pont de Nemours & Co.

Substituted ethylene oxide compounds and process for preparing the same. No. 2,393,129. Frank Tendick to Parke, Davis & Co.

Production of 2-vinylpyrrole. No. 2,393,132. Cary Wagner to Phillips Petroleum Co.

3-beta-methallyl-4-methallyloxy-diphenylamine. No. 2,393,156. Carlin Gibbs to The B. F. Goodrich Co.

1,3,5-triazinyl-phenyl-sulphides carrying a metallic radical. No. 2,391,452. Ernst Friedheim.

Preparation of vinyl chloride, which comprises passing mixture of acetylene and hydrogen chloride over preformed catalyst consisting of dispersed mercurous chloride commingled with porous carrier by impregnating carrier with aqueous solution of mercuric chloride and then reducing latter in situ to mercurous state. No. 2,391,465. Wilbur Lazier and Gerald Whitman to E. I. du Pont de Nemours & Co.

Refining crude cyanogen chloride containing hydrogen chloride and chlorine. No. 2,391,490. Jack Thurston and Russell Sperry to American Cyanamid Co.

Free-flowing, non-dusting pelletized mass comprising crystals of nitroso beta naphthol cemented with an eutectic comprising nitroso beta naphthol and abietic acid. No. 2,391,837. Victor King and Henry Orem to American Cyanamid Co.

Removing dissolved water from alkyl phenols containing it and water-soluble carboxylic acid salts. No. 2,391,839. Clifford Magin and Lloyd Fetterly to Shell Development Co.

5-Nitrohexahydropyrimidines and process for preparation thereof. No. 2,391,847. Murry Senkus.

Aromatic amine prepared by reacting ammonia with aryl halide in presence of copper-containing catalyst and within reactor constructed of ferrous metal, step of carrying reaction out in presence of compound selected from oxides and hydroxides of calcium, tin, lead, arsenic, and antimony, whereby corrosion of reactor is inhibited. No. 2,391,848. Harold Slagh to The Dow Chemical Co.

*Paints, Pigments

Removing paints and varnishes from solid surfaces which comprises applying material from anacardic acid and cashew nut shell liquid to film, permitting it to remain in contact until film has disintegrated. No. 2,392,699. Robert Sadtler, one-fourth to Ney Underwood, Jr.

Preparing alkali resistant iron blue pigment. No. 2,392,073. Andries Voet to General Printing Ink Corp.

Coloring object of wood throughout interior portions which comprises immersing object in alkaline solution containing stabilized diazotized arylamine and an azo pigment coupling component, etc. No. 2,391,613. Crayton Black to E. I. du Pont de Nemours & Co.

Applying characters to surface, said characters being visible in both daylight and ultra-violet light, which comprises printing with base coat

* *Continued from Vol.* 581, *No.* 4, *Vol.* 582, *No.* 1, 2, 3.

comprising tacky sizing material, and dusting on powdered luminescent material, the individual particles of which are coated with partial ester of high molecular weight monocarboxylic acid and a polyhydric alcohol. No. 2,391,705. Sampson Isenberg to General Luminescent Corp.

*Paper, Pulp

Disposing of sulphite waste liquor derived from manufacturing pulp by calcium bisulphite digestion of wood. No. 2,392,435. Richard Tyler.

Chemically prepared wood pulp having incorporated water soluble mixed thio ether containing polyethylene oxide radical and aliphatic hydrocarbon radical. No. 2,392,103. Paul Schlosser and Kenneth Gray to Rayonier Inc.

Preparing hygroscopic fertilizer from sulphite waste liquor containing lignin in solution. No. 2,392,811. Eric Eweson.

Asphaltic material in which is incorporated tall oil to impart enhanced properties to composition of adhering with tenacity to wet stone surfaces. No. 2,392,863. Kenneth Rudd to The Standard Oil Co.

Stable nonalkaline paper sizing composition consisting of dispersion of free rosin and nonalkaline organic dispersing agent for rosin in water and a protective colloid to stabilize dispersion. No. 2,393,179. Robert Mashburn to Hercules Powder Co.

Recovering by-products from waste liquors obtained in soda pulp process which includes spray drying said liquors, etc. No. 2,391,566. Edward Goodell.

Coating paper which comprises bringing extended surface of paper in brief contact with solution of vinyl resin in a solvent, drying, and baking coated paper. No. 2,391,619. Arthur Doolittle to Carbide and Carbon Chemicals Corp.

Moistureproofing paper which comprises forming on surface of paper a non-homogeneous deposit of resinous vinyl polymer formed from vinyl chloride. and a wax incompatible therewith, and baking. No. 2,391,620. Richard Quarles and Arthur Doolittle to Carbide and Carbon Chemicals Corp.

Coating paper which comprises dispersing copolymer of vinyl chloride, vinyl acetate, maleic acid, a copolymer of vinyl chloride, and vinyl acetate, and a paraffin wax, in a mixture of methyl ethyl ketone, methyl isobutyl ketone and hydrogenated petroleum naphtha, to form coating. No. 2,391,621. George Powell, III, and William McKnight to Carbide and Carbon Chemicals Corp.

*Petroleum

Preparing iso-paraffins which comprises contacting ethylene with Friedel-Crafts type catalyst selected from aluminum chloride, aluminum bromide, and their ethylene complexes in presence of hydrogen chloride. No. 2,392,454. Donald Bond and Nelson Russell to The Pure Oil Co.

Producing film-forming material from mixture of non-paraffinic hydrocarbons derived from solvent processing, with aqueous phenol solvent, of petroleum oil to increase concentration of paraffinic constituents therein. No. 2,392,497. Joseph O'Neill to Sinclair Refining Co. Inc.

Improving cetane value of hydrocarbon fuel oil containing aromatic constituents and characterized by low cetane value. No. 2,392,570. Henry Berger and Darwin Badertscher to Socony-Vacuum Oil Co. Inc.

Treatment of olefinic sulphur-bearing gasoline to effect substantial desulphurization and refining. No. 2,392,579. Robert Cole to Shell Development Co.

Producing lower boiling hydrocarbons from higher boiling carbonaceous material which comprises contacting higher boiling material and molecular excess of hydrogen under pressure in presence of catalyst containing less than 20% silica comprising alumina and boric oxide. No. 2,392,588. Bernard Greensfelder and William Bailey to Shell Development Co.

Improving aromaticity of a hydrocarbon which comprises contacting hydrocarbon with catalyst comprising reaction product formed by combining a VI group oxide with one of nickel oxide and cobalt oxide, which reaction product is supported on a zinc spinel base. No. 2,392,738. Clinton Holder and Albert Welty to Standard Oil Development Co.

Maintaining uniform delivery of catalyst to hydrocarbon oil and conversion coil. No. 2,392,764. Edward Reeves to Standard Oil Development Co.

Cracking hydrocarbons. No. 2,392,773. Jackson Schonberg and Harold Moyer to Standard Oil Development Co.

Isomerization of normal paraffin hydrocarbon to iso-paraffin in presence of a catalyst and gaseous promoter. No. 2,392,791. William Webber to Standard Oil Development Co.

Conversion of hydrocarbon oils wherein oil is passed through conversion zone containing conversion catalyst and wherein catalyst after being utilized in conversion treatment is subjected to regeeration in a regeneration zone and thereafter reutilized for further conversion, etc. No. 2,391,944. Leonard Carlsmith to Standard Oil Development Co.

Treating cracked naphtha stocks consisting of olefin and aromatic hydrocarbons to produce improved blending stock adapted as component of aviation gasoline. No. 2,391,962. Arthur Goldsby to Texaco Development Corp.

Producing polymer naphtha which comprises passing hydrocarbon vapor consisting of propylene through contact mass of polymerization catalyst consisting of a calcined mixture of precipitated silica, alumina, and zirconia. No. 2,392,000. Charles Randolph, Jr. and Nelson Haskell to The Texas Co.

Conversion of hydrocarbons in which dry hydrogen halide is added with hydrocarbon charge and mixture of hydrogen halide and hydrocarbon gases is separated from conversion products, improvement which comprises removing hydrogen halide in extraction step by contacting mixture with lean aqueous solution of hydrogen halide. No. 2,392,047. Louis Kassel to Universal Oil Products Co.

Purifying hydrocarbon liquid containing dissolved hydrogen fluoride which comprises subjecting liquid to extraction treatment with solution comprising water and hydrogen fluoride. No. 2,392,048. Louis Kassel to Universal Oil Products Co.

Hydrocarbon conversion process which comprises contacting hydrocarbon with catalyst comprising dehydrated alumina gel carrier in combination with activating oxide of metal of left-hand column of group VI of periodic table and alumina deposited on catalyst as residue of thermally decomposed aluminum salt. No. 2,392,248. Edwin Layng and Seymore Goldwasser to The M. W. Kellogg Co.

Refining petroleum residual wax which has been subjected to aluminum chloride treatment and containing aluminum chloride induced corrosive substances, comprising reacting wax with plumbite from alkali and alkaline earth metal plumbites. No. 2,392,853. Anthony Kinsel to L. Sonneborn Sons, Inc.

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Recovery of butanes from natural and casing head gases by absorption thereof in absorber oil, method of producing more valuable products from recovered butanes. No. 2,392,896. Samuel Allender to Universal Oil Products Co.

Purifying hydrocarbon mixture containing as impurity organically combined fluorine to remove fluorine therefrom which comprises contacting mixture with activated carbon in presence of hydrogen fluoride. No. 2,392,915. Aristid Grosse and Carl Linn to Universal Oil Products Co.

Preparing gasoline from crude petroleum oil poor in gasoline fractions. No. 2,392,949. William Ross and Kenneth Boldt to The Pure Oil Co.

Hydrocarbon conversion process wherein hydrocarbons are contacted with body of subdivided solid catalyst and said body of catalyst is subsequently regenerated in situ by burning of combustible deposits therefrom. No. 2,392,957. Charles Thomas to Universal Oil Products Co.

Controlling reaction time in hydrofluoric acid catalyzed isoparaffin-olefin alkylation reaction comprising diluting hydrofluoric acid catalyst to concentration below its effective catalyst concentration by admixing water therewith. No. 2,392,962. Armand Abrams and Carl Kuhn, Jr. to Socony-Vacuum Oil Co. Inc.

Increasing production of oil well wherein solvent is injected into oil-bearing formations which contain heavy viscous oils surrounding input well and oily is removed from production well, process which comprises injecting solvent consisting of non-viscous petroleum fraction having sulfur content in excess of 5%. No. 2,392,971. Alva Byrns to Union Oil Co. of California.

Preparing charge stock for vapor phase catalytic cracking from crude oil from which constituents lighter than gas oil have been removed. No. 2,393,028. George Dunham to Socony-Vacuum Oil Co. Inc.

Catalytic isomerization of lower boiling isomerizable hydrocarbons. No. 2,393,041. Bernard Greensfelder to Shell Development Co.

Drilling oil or gas wells, which comprises introducing into well aqueous suspension of gel-forming body together with finely divided ferro-alloy selected from ferro-phosphorus, ferro-silicon, etc. No. 2,393,047. Herbert Krase to Monsanto Chemical Co.

Gas analysis system for gaseous material entrained in well-drilling fluids, combination comprising extraction chamber, containing baffles arranged for continuous flow of fluid therethrough, etc. No. 2,393,092. Richard Doan to Phillips Petroleum Co.

Isomerizing normally liquid paraffin hydrocarbon boiling in gasoline range which comprises subjecting paraffin, while in admixture with non-olefinic cyclic hydrocarbon to isomerizing catalyst of Friedel-Crafts type in presence of added hydrogen halide. No. 2,393,104. Aristid Grosse and Herman Pines to Universal Oil Products Co.

Preventing filtration of water from salt water drilling fluid into porous formations traversed by borehole, comprising adding to fluid gelatinized starch. No. 2,393,145. Thomas Chapman to Standard Oil Development Co.

Reacting isoparaffin with monoolefin in presence of sulfuric acid of alkylating concentration, said acid containing alkylation-promoting agent selected from wetting agents consisting of high molecular weight N-acyl taurines, and sulfuric acid esters of high molecular weight aliphatic monohydric alcohols. No. 2,393,152. Carleton Ellis to Standard Oil Development Co.

Treatment of alkylate product obtained by reacting olefin and isoparaffin in presence of acid catalyst including separating alkylate product from catalyst. No. 2,393,154. Joe Franklin, Jr. to Standard Oil Development Co.

Drilling wells using aqueous mud-laden fluid contaminated by sulfate ions during drilling, comprising, adding to fluid a salt of acid whose calcium salt is insoluble and of a base whose sulfate salt is insoluble and which itself is soluble to react with sulfates. No. 2,393,165. Raymond Hoeppel to National Lead Co.

Drilling wells using mud-laden fluid subject to contamination by hydroxyl ions, comprising, adding to fluid a salt of acid whose calcium salt is insoluble and of a base whose sulfate salt is insoluble, together with a sulfate of a metal whose hydroxide is insoluble. No. 2,393,166. Raymond Hoeppel to National Lead Co.

Compacting or sealing formations, comprising, introducing into formation a deflocculated suspension of a comminuted material which is of particle size and character as to be non-colloidal, non-gelling, non swelling. No. 2,393,173. Delmar Larsen to National Lead Co.

Well-drilling fluid material, comprising, alkali-metal gel-forming bentonite which is deficient in water-soluble electrolytes and containing added non-caustic electrolyte. No. 2,393,174. Delmar Larsen to National Lead Co.

Treating liquid petroleum product containing free or loosely combined sulfur to inhibit tendency to deposit copper sulfide stain on surfaces of copper and copper alloys which comprises adding to petroleum product a compound of formula RCN, where R is member of aliphatic and aromatic radicals. No. 2,393,212. David Young and Theodore Peters, Jr. to Standard Oil Development Co.

Conversion of acid sludge resulting from treatment of petroluem distillate with sulphuric acid into an active carbon. No. 2,393,214. Ralph Andrews to Wilson Carbon Co. Inc.

Producing saturated branched chain hydrocarbons. No. 2,391,399. Charles Dryer to Universal Oil Products Co.

Separation of unsaturated hydrocarbon from hydrocarbon mixture which comprises contacting mixture with a solution of silver salt in a water-soluble organic compound selected from glycols and glycol ethers. No. 2,391,404. Bernard Friedman and Russell Stedman to Universal Oil Products Co.

Production of high anti-knock motor fuel hydrocarbons which comprises polymerizing normally gaseous olefin of at least 3 carbon atoms to form normally liquid polymer and then reacting polymer with isobutane, to form isoparaffin. No. 2,391,415. Aristid Grosse and Carl Linn to Universal Oil Products Co.

Converting high boiling hydrocarbons to low boiling hydrocarbons within gasoline boiling range which comprises vaporizing gas oil and passing vapors in contact with catalyst made by adding hydrolyzable salt of aluminum and acid to sodium silicate. No. 2,301,481. Robert Ruthruff, one-half to The M. W. Kellogg Co. and one-half to Process Management Co. Inc.

Catalytic conversion of hydrocarbon oils wherein silica gel containing other catalytic agents is employed as a catalyst and wherein catalyst is subjected to repeated regenerations by oxidation between conversion treatments to remove carbonaceous deposits formed. No. 2,391,482 Robert Ruthruff, one-half to The M. W. Kellogg Co., and one-half to Process Management Co. Inc.

High pressure separation of hydrocarbon mixtures. No. 2,391,576. Donald Katz and Thomas Whaley, Jr. to Phillips Petroleum Co.

Separating asphalt-free lubricating oil stock from crude oil stock con-

taining same in admixture with asphalt by high pressure separation process. No. 2,391,607. Thomas Whaley to Phillips Petroleum Co.

Compounded aqueous drilling mud having pH value of 10 and for brine-producing wells comprising aqueous drilling mud, starch, and basic substance capable of reacting with calcium ions to form an insoluble salt, whereby excessive water loss is overcome. No. 2,391,622. Thomas Dunn to Stanolind Oil and Gas Co.

Conversion of normal alphatic hydrocarbons into branched chain hydrocarbons by use of anhydrous metallic halide such as aluminum chloride as contact catalyst and hydrogen halide such as hydrogen chloride and water as catalyst activating agents. No. 2,391,775. Eric Fawcett and Eric Narracott to Anglo-Iranian Oil Co. Ltd.

Manufacturing side chain benzene hydrocarbons in which petroleum oil distilate stock low in aromatic hydrocarbons is cracked to produce vapor mixture consisting largely of unsaturated olefinic hydrocarbons. No. 2,391,818. David Brandt to Cities Service Oil Co.

*Photographic

Reproducing images from plate surfaces consisting of preparing original image retaining plate with image on one surface thereof, said image retaining plate being immune to longitudinal and transverse dimensional variations due to changes in atmospheric moisture, then preparing negative with sensitized surface thereon, etc. No. 2,392,343. Philip Taber and Lawrence Van Dusen to D. L. Ward Co.

Medium for preparing transparent prints for making contact prints, which comprises transparent sheet having on one surface a chemically-developable photographically invisible pattern, and coating of a light sensitive material on other surface. No. 2,392,414. Louis Sanders.

Temporary flexible paper support, of photographic light-sensitive gelatin layer which can be transferred from temporary support to liquid-coated surface of a permanent support by squeegeeing it thereon, and retaining layer consisting of a prolamine. No. 2,392,503. Rowland Potter and Robert Brown to E. I. du Pont de Nemours & Co.

Multilayer reversal color film and a method of processing the same. No. 2,393,027. Herman Duerr and Herbert Morreall, Jr. to General Aniline & Film Corp.

*Polymers

Making polymers which comprises heating mixture of chlorotrifluoroethylene and olefin hydrocarbon in contact with peroxy compound at ctalyst. No. 2,392,378. William Hanford to E. I. du Pont de Nemours & Co.

Manufacture of electric motors comprising insulating armature slots with polytetrafluoroethylene. No. 2,392,388. Robert Joyce, Jr. to E. I. du Pont de Nemours & Co.

Obtaining decolorized polytetrafluoroethylene. No. 2,392,389. Robert Joyce, Jr. to E. I. du Pont de Nemours & Co.

Monodisulphide polymer. No. 2,392,402. Joseph Patrick to Thiokol Corp.

Composite article comprising layer of rubber-like material derived from partially hydrolyzed polyvinyl ester, layer of metal having phenolic resin base coat, and adhesive coating intermediate said layers, said adhesive comprising partially hydrolyzed polyvinyl acetate, red iron oxide, lead chromate, magnesium oxide, and heat-hardened-in-situ phenol-aldehyde resin. No. 2,392,574. Charles Brown to United States Rubber Co.

Preparing rigid sheet of transparent polymer of ester containing two unsaturated radicals having unsaturation in aliphatic carbon chain. No. 2,392,578. Albert Chenicek to Pittsburgh Plate Glass Co.

Conducting plurality of successive batch polymerization operations in single polymerization vessel each of which polymerization operations involves polymerization of monomer mixture in aqueous emulsion containing emulsifying agent to form latex-like aqueous dispersion of elastic rubbery material, said monomer mixture comprising butadiene-1,3 and another monomer which contains a $CH_2=C<$ group. No. 2,392,585. Charles Fryling to The B. F. Goodrich Co.

Composition comprising normally solid material selected from polymerized vinyl chloride, vinyl acetate, vinyl chloracetate, vinyl butyral and copolymers of vinyl chloride and vinyl acetate and a normally liquid organic condensation reaction products of formaldehyde and a tertiary alkyl alcohol, etc. No. 2,392,589. Mortimer Harvey to Harvel Research Corp.

Preparing casting composition, which comprises reacting under alkaline conditions phenol and aqueous formaldehyde in presence of polyvinyl alcohol, and dehydrating reacted mixture under acid conditions. No. 2,392,686. Frederick Murdock to Monsanto Chemical Co.

Preparation of rubber-phenol aldehyde condensation products consisting in dispersing rubber in phenol with metallic oxidizing catalyst such as cobalt naphthenate, oxidizing rubber, adding formaldehyde and acid condensation catalyst, etc. No. 2,392,691. Frederick Popham to The British Rubber Producers' Research Association.

Interpolymerizing styrene, and mixture of partially polymerized dehydrated castor oil and partially polymerized linseed oil. No. 2,392,710. Leslie Wakeford and Donald Hewitt.

Polymerizing a halogen-substituted 1,3-butadiene in presence of a diester of an aliphatic alpha-unsaturated alpha, beta-dicarboxylic acid and a monohydric unsaturated alcohol. No. 2,392,756. Charles Mighton to E. I. du Pont de Nemours & Co.

Polymerizing ethylene which comprises heating ethylene in presence of catalyst comprising a dialkyl dioxide of formula ROOR' in which R and R' are simple unsubstituted alkyl groups, containing not more than three carbon atoms. No. 2,391,920. Merlin Peterson to E. I. du Pont de Nemours & Co.

Sunbathing apparel made of thin, flexible, translucent, thermoplastic sheets containing ultraviolet light filtering agents, said apparel being opaque to visible radiations. No. 2,391,959. George Gallowhur.

Plastic composition resistant to change in color and solubility on exposure to light and heat comprising polyvinyl partial acetal resin physically admixed with composition of a thiourea containing radical $=NCSN=$. No. 2,392,041. Frazier Groff to Carbide and Carbon Chemicals Corp.

Preparing improved anion exchanger comprising heating anion exchanging aromatic primary amine-saccharide resin, insoluble in dilute aqueous solutions of acids and bases, with ammonia and a halide hydrolyzing in water to give acid reaction as catalyst. No. 2,392,105. Sidney Sussman to The Permutit Co.

In closure structure, sheet interlayer of organic plastic, glass plates bonded to opposite sides of interlayer and having their edges extending beyond edges of interlayer to define channel between said plates along marginal portions. No. 2,392,129. Daniel Downes to Pittsburgh Plate Glass Co.

* *Continued from Vol. 581, No. 4, Vol. 582, No. 1, 2, 3.*

Production of linear polymers, which comprises heating reaction mass containing organic molecules each of which contains only two reactive radicles linked by polymethylene chain containing more than 2 and less than 11 chain atoms, said radicles being alcoholic hydroxy radicles. No. 2,392,131. Henry Dreyfus; Claude Bonard, administrator of Henry Dreyfus, deceased.

Production of linear polymers of high molecular weight, which comprises heating, until polymer having film-forming properties is obtained, a reaction mass wherein sole polymer-forming molecules present are molecules containing only two reactive radicles linked by divalent organic radicles containing at least 3 and not more than 10 chain atoms, said reactive radicles being selected from urea, thiourea and of primary and secondary amino radicles with urea and thiourea. No. 2,392,132. Henry Dreyfus; Claude Bonard, administrator of Henry Dreyfus, deceased.

Suspension of non-cohering powder of copolymer of vinyl acetate and vinyl chloride of particle size to pass screen of 200 mesh, in a medium comprising water containing in solution enough of water-soluble organic plasticizer for plastic to plasticize latter when water evaporates. No. 2,392,135. Henry Farr, Jr. to Pittsburgh Plate Glass Co.

Clear and hard plastic composition consisting of conjoint addendum polymer of maleic anhydride and styrene. No. 2,392,139. Howard Gerhart to Pittsburgh Plate Glass Co.

Preparing a copolymer of cyclopentadiene and an unsaturated glyceride oil. No. 2,392,140. Howard Gerhart to Pittsburgh Plate Glass Co.

Making molding powder which comprises subjecting redwood to heat treatment in presence of steam at pressure, etc. No. 2,392,162. Harry Lewis to The Pacific Lumber Co.

Making molding ingredient which comprises subjecting tannin wood to heat treatment in presence of steam at pressure of 500 to 800 pounds per square inch, etc. No. 2,392,163. Harry Lewis to The Pacific Lumber Co.

Making coiled structures which comprises twisting one end of a monofil formed of polymer held in straightened position under tension while other end is held stationary to twist. No. 2,392,842. Howard Doell to E. I. du Pont de Nemours & Co.

Interpolymer of isobutylene with a diolefin having less than 7 carbon atoms, characterized by molecular weight within 25,000 to 100,000, etc. No. 2,392,846. Per Frolich to Jasco, Inc.

Iso-olefin-diolefin interpolymer characterized by molecular weight within range of 15,000 to 250,000, etc. No. 2,392,855. Irving Lightbown and Nathan Beekley, Jr. to Jasco, Inc.

Gelatinised composition comprising polyvinyl chloride, polymerised methyl methacrylate, and non-polymerisable liquid plasticiser for both polymers. No. 2,392,857. John McGill to Imperial Chemical Industries Ltd.

Making mold for artificial tooth which comprises providing plaster model of tooth, disposing around model a molten vinyl chloride, etc. No. 2,392,929. Pyungtoo Lee to The Dentists' Supply Co. of New York.

Preparing water-vapor-resistant surface on porous paper which comprises coating paper with polymer of monomeric substance containing vinyl chloride, treating coated paper with solution of copolymer of vinyl-idene chloride and vinyl chloride dissolved in aromatic hydrocarbon. No. 2,392,972. La Verne Cheyney to Wingfoot Corp.

Preparing copolymers of butadiene-1,3 and aliphatic acrylonitrile by polymerization in medium containing emulsifying agent and peroxide oxidant. No. 2,393,007. William Wolfe to Wingfoot Corp.

Producing heat-stable, water-insoluble, solid bodies which consists in bringing a preformed, plastic body of a water-continuous emulsion containing emulsifiable, thermoplastic organic solid and water-soluble salt of alginic acid into contact with aqueous solution of salt of metal whose ions form water-insoluble salt with alginic acid, and thereby solidifying entire mass. No. 2,393,022. Donald Clark, Arnold Steiner and Kenneth Gibsen to Kelco Co.

Forming laminated structures which comprises mixing acetylene black with synthetic resin adhesive to give mixture direct current resistance without destroying its adhesive properties, incorporating mixture with laminae, etc. No. 2,393,100. Wilfred Gallay and Gerald Graham to The Honorary Advisory Council for Scientific and Industrial Research.

Polymerization of aqueous emulsion of mixture of butadiene-1,3 and styrene, step of carrying out polymerization in presence, as emulsifying agent, of soap of soap-forming monocarboxylic acid having 12 to 20 carbon atoms and a volatile alkyl monoamine. No. 2,393,133. Leland White to United States Rubber Co.

Producing emulsion polymerizates which consists of emulsifying in water an unsaturated organic compound from conjugated aliphatic diolefin hydrocarbons and mixtures of conjugated aliphatic diolefin hydrocarbons with compounds copolymerizable with said conjugated diolefins under conditions of reaction containing a single $C=C$ linkage per molecule in presence of oxygen providing polymerization catalyst and emulsifier. No. 2,393,157. Anthony Gleason and William Sparks to Jasco, Inc.

Making hard, high melting waxy material comprising reacting amide of a high saturataed aliphatic acid containing from sixteen to twenty-two carbon atoms with formaldehyde. No. 2,393,202. Lou Stegemeyer to Emery Industries, Inc.

Preparing interpolymers of a conjugated diolefin of from four to six carbon atoms per molecule and a nitrile. No. 2,393,206. Byron Vanderbilt to Standard Oil Development Co.

Coagulating latex obtained by polymerization of mixture containing vinyl aromatic compound from styrene, alpha methyl styrene, para methyl styrene and alpha methyl para methyl styrene with conjugated diolefin. No. 2,393,208. Wendell Waterman and Paul Parker to Standard Oil Development Co.

Continuously polymerizing a monomeric polymerizable liquid organic compound to form syrup of polymer dissolved in monomer. No. 2,391,393. Raphael Coffman and Barnard Marks to E. I. du Pont de Nemours & Co.

Resinous reaction product of (1) chlorinated acetamide and (2) product of partial reaction of ingredients including formaldehyde and compound corresponding to general formula described in patent. No. 2,391,683. Gaetano D'Alelio and James Underwood to General Electric Co.

Reclaiming scrap containing elastic polychloroprene which comprises mixing therewith material containing cellulose fibers and heating scrap. No. 2,391,714. Walter Kirby and Leo Steinle to United States Rubber Co.

Condensation products selected from higher fatty acid amides and ester-amides of organic sulphonic acid salts of hydroxylated aliphatic polyamines. No. 2,391,830. David Jayne, Jr. and Harold Day to American Cyanamid Co.

*Processes and Methods

Carbonizing thoriated filamentary material comprising bubbling gas through xylene diluted with oil to reduce its vapor pressure, and heating material

in atmosphere so produced. No. 2,392,318. Daniel Gustin and Nelson Bryant to Westinghouse Electric Corp.

Detecting presence of a hydrocarbon in admixture with other hydrocarbons comprising adding to first hydrocarbon a fluorescent marker selected from umbelliferone and umbelliferone derivatives, extracting hydrocarbon mixture with aqueous alkaline solution, and then examining extract under light means for detecting fluorescence of marker. No. 2,392,621. Franklin Strain to Pittsburgh Plate Glass Co.

Determining fineness of powder through determining total surface of a bed thereof. No. 2,392,636. Robert Boehler to Universal Atlas Cement Co.

Testing powdered materials for determining total surface thereof. No. 2,392,637. Robert Boehler to Universal Atlas Cement Co.

Decreasing gas permeability of wall of tubular carbon article comprising heating such wall to temperature above decomposition temperature of gaseous carbon compound capable of being thermally decomposed to deposit carbon, etc. No. 2,392,682. Leroy Marek to Arthur D. Little, Inc.

Controlling flow of powdered material from container to zone in which powdered material is utilized, which comprises placing powdered material under constant superatmospheric pressure and forcing powdered material upwardly through tube extending through top of said container to near bottom thereof, etc. No. 2,392,765. Edward Reeves to Standard Oil Development Co.

Producing purified material of certain kind from impure starting aggregate having part of said kind of material integrally coated with or stained by impurities, said coatings and stained material having less resistance to disruption by impact than pure material, which comprises, introducing aggregate and fluid under pressure into plurality of guns, etc. No. 2,392,019. Edwin Wiegand to Orefraction Inc.

Submitting liquid amalgam to reaction conditions, which comprises causing it to rise by capillary action in plurality of closely adjacent open paths from body thereof having maintained level and then to flow downwardly in open closely adjacent paths longer than rising paths onto continuous receiving surface arranged for gravity flow. No. 2,392,235. George Edwards to Imperial Chemical Industries Ltd.

Improving appearance of surfaces of soap which comprises immersing piece of soap for brief time into bath of water. No. 2,392,831. John Bodman to Lever Brothers Co.

Recovering distillate containing solute in controlled concentration from complex starting liquid having solvent, solute and third constituent less volatile than both solvent and solute. No. 2,392,862. John Pernert to Oldbury Electro-Chemical Co.

Pulverising material by use of elastic fluid comprising entraining material in a jet of fluid from a nozzle constructed and arranged to expand elastic fluid to critical pressure with respect to initial pressure so that jet acquires acoustic velocity for pressure and temperature conditions of jet to effect comminution of material. No. 2,392,866. Nicholas Stephanoff to Thermo-Plastics Corp.

De-contaminating area upon which poisonous substance has been spread which comprises spreading over area a dense persistent blanket of foam having hypochlorite distributed therein. No. 2,392,936. Harry Mattin and Lewis Timpson to The Mearl Corp.

Method of carrying out catalyst reactions. No. 2,391,434. Jerry McAfee to Universal Oil Products Co.

Drying of cellular organic products containing large percentage of moisture, subjecting product in small particles in thin layers in enclosed chamber forming drying zone to a reduced pressure in atmosphere of steam free from air, supplying heat to product from source of radiant energy. No. 2,391,441. John Baer to The Guardite Corp.

Removing deposit from wall of coking oven while oven is hot which consists in pushing deposit from wall and applying suction. No. 2,391,443. Albert Bruton to H. A. Brassert & Co.

Apparatus for treating finely divided solid material with gas comprising furnace shaft, circular hearth therein, etc. No. 2,391,496. Carl Westling to Minerals and Metals Corp.

*Rubber

Recapping rubber tires with vulcanizable rubber-like copolymer of conjugated diolefine and isobutylene tread stock. No. 2,392,590. William Hulswit, Jr. and Henry Wiechman to United States Rubber Co.

Adhesively bonding rubber composition to metal surface by heat and pressure and intermediately disposed layer which includes rubber chloride in combination with rubber derivative obtained by depolymerizing action of heat and oxygen on dissolved raw rubber in presence of free sulphur and a vulcanization accelerator. No. 2,392,618. Omar Smith to United States Rubber Co.

Sheet of rubber having tacky surface and protective covering comprising self-sustaining plasticized preformed film of a water-soluble polyvinyl alcohol identical with that formed by hydrolysis of 95% of acetyl groups of polyvinyl acetate. No. 2,391,986. Lloyd Leach to E. I. du Pont de Nemours & Co.

Preventing crazing of synthetic rubber in contact with liquid aromatic hydrocarbons, comprising employing with synthetic rubber liquid aromatic hydrocarbons an aliphatic polyamine. No. 2,392,881. William Rittschof and Wayne Proell to Standard Oil Co.

Container for liquid fuel comprising rigid tank and covering for tank comprising sealing layer of flowable, plastic material comprising unvulcanized rubber and synthetic rubber-like material which is insoluble in hydrocarbon fuels and compressive layer of non-plastic, elastic and resilient material comprising vulcanized rubber and synthetic rubber-like material. No. 2,392,902. Richard Crawford to The B. F. Goodrich Co.

Vulcanized rubber windshield wiper containing sulfonated organic di-basic acid ester. No. 2,392,982. Marcellus Flaxman to Union Oil Co. of California.

Mechanically recovering rubber from roots of Russian dandelions. No. 2,393,035. Roderick Eskew and Paul Edwards to the Secretary of Agriculture of the United States of America.

Rubber-like article comprising base of factice and flexible water-soluble binder of cellulose derivative, said composition having property of resistance to humidity and to disintegration. No. 2,393,222. Adolph Pischel and Harry Stowe to Eagle Pencil Co.

Self-sealing fuel tank comprising inner layer of fabric impregnated with butadiene polymer and layer of cattle hide, layer of shock-absorbing sponge rubber, layer of crude rubber, and outer layer of chrome-tanned cattle hide. No. 2,391,477. Ewell Phillips.

Vulcanizable composition comprising (1) elastic, linear hydrocarbon copolymer of branched-chain mono-olefine and conjugated diolefine, said copolymer of (1) having incorporated therein (2) p-quinone dioxime, (3) a peroxide, (4) sulfur and (5) compound of class consisting of thiurams and dithiocarbamates. No. 2,391,742. Alvin Roberts to General Electric Co.

Rubber-like copolymers and method of making, comprising polymerizing mixture of methylpentadiene selected from 2-methyl-1,3-pentadiene and 4-methyl-1,3-pentadiene, different conjugated double bond diolefin, and compound of group consisting of styrene, alpha methyl styrene, acrylonitrile and methacrylonitrile. No. 2,391,817. Billee Blackburn to Shell Development Co.

*Specialties

Free-flowing, non-caking, readily-dispersing and caustic alkali-free composition for use as adhesive when mixed with water, which comprises soybean flour impregnated with liquid preserving-dispersing agent, and containing water and clay. No. 2,392,302. Chester Baker and Robert Sams to Philadelphia Quartz Co.

Insecticidal composition comprising thiocyanoacetate of starch and mixture of pyrophyllite and fuller's earth. No. 2,392,359. Joseph Borglin to Hercules Powder Co.

Printing ink containing carbon black, characterized by its lack of bloom and halo on printing, and by excellent dispersion of carbon black in composition, comprising vehicle from oil, resinous and oleoresinous film-forming compositions, and containing as toner and dispersing agent the reaction product of a basic dyestuff and fatty acid or lauric, myristic and palmitic acids. No. 2,392,376. Werner Goepfert to Interchemical Corp.

Inhibitor for preventing dissolution of iron or steel in dilute solutions of non-oxidizing mineral acid comprising di ortho xenyl thiourea and sodium sulfate. No. 2,392,404. Harry Peterson to Lotte Chemical Co. Inc.

Gasket lining composition for lining seams of sheet metal containers for anti-freeze liquids, comprising resinous material consisting of copolymer of vinyl acetate and vinyl chloride, together with mixture of chlorinated diphenyl and butyl phthalyl butyl glycollate as plasticizer, a compatible solvent, and a filling and coloring material. No. 2,392,412. John Robinson and Paul Millelot, Jr. to American Can Co.

Insecticide containing 3-nitroacenaphthene. No. 2,392,455. Charles Bowen and Lloyd Smith to the Secretary of Agriculture of the United States of America.

Oil-in-water type bituminous emulsion comprises bitumen, alkaline aqueous phase having pH greater than 9, a stabilizer comprising homogeneous liquid blood which contains fibrinogen to produce clotting thereof, and water-soluble salt whose anion froms water-insoluble salt with calcium ions to inhibit gel formation. No. 2,392,457. Walter Buckley and Edwin Bly to American Bitumuls Co.

Organic phosphorus lubricant compositions. No. 2,392,468. Ernest Engelke to Cities Service Oil Co.

Smoking tobacco having myosmine incorporated therewith. No. 2,302,514. Charles Woodward and Abner Eisner and Paul Haines to the Secretary of Agriculture of the United States of America.

Lubricating and hydraulic composition consisting of alkyl phosphate having from one to five carbon atoms in alkyl radicals and synthetic thermo-plastic resin. No. 2,392,530. William Hamilton, Melvin George and Glenn Weible to Lockheed Aircraft Corp.

Improved Diesel fuel comprising non-viscous hydrocarbon oil and in admixture to improve ignition quality of fuel, a halogen- and nitrogen-containing reaction product comprised of compound selected from halogen-substituted introlic acids and halogen-substituted pseudonitroles. No. 2,392,610. Thomas Noland and Edwin Nygaard to Socony-Vacuum Oil Co. Inc.

Diesel fuel comprising non-viscous hydrocarbon oil and in admixture to improve ignition quality of fuel, a compound containing characterizing group $T-N=N-C-NO_2$ wherein T represents aryl group. No. 2,392,611. Edwin Nygaard, John McCracken and Nathan Hamilton to Socony-Vacuum Oil Co. Inc.

Tacky pressure-sensitive eucohesive adhesive comprising rubbery base, constituted of a toluol-solvent alkyd resin elastomer reaction product of a polyhydric oil and polybasic acid; combined with tackifier resin containing abietate radical. No. 2,392,639. Howard Brinker and Gilbert Gehrenbeck to Minnesota Mining & Manufacturing Co.

Induline ink toner and carbon ink, reaction product of lauric acid, and induline base. No. 2,392,657. Werner Goepfert to Interchemical Corp.

Methyl violet ink toner and carbon ink, reaction product of myristic acid and methyl violet base. No. 2,392,658. Werner Goepfret to Interchemical Corp.

Mothproofing composition containing a benzyl phenyl ether having nuclear chlorine substituent in benzyl group and a molecular weight less than about 360. No. 2,392,733. Avery Goddin and Norman Searle to E. I. du Pont de Nemours & Co.

Mineral oil composition comprising viscous mineral oil and in admixture to improve quality of mineral oil, an oil-soluble reaction product of a mercaptothiazole and a basic polyvalent metal salt of an organic compound. No. 2,392,766. Orland Reiff to Socony-Vacuum Oil Co. Inc.

Cleansing composition in paste form comprising mixture of heavy petroleum oil distillate from lubricating oils and gas oils, a sodium petroleum sulfonate, water and a finely divided, non-abrasive, absorbent material. No. 2,392,779. Jere Showalter to Standard Oil Development Co.

Fumigating insect infested grain stored in bins, introducing volatile fumigant comprising solution of ethylene bromide in carbon tetrachloride. No. 2,391,890. Fred Fletcher and Eugene Kenaga to The Dow Chemical Co.

Candle comprising body of wax and core comprising mixture of wax and an aerogel. No. 2,391,988. Clarence Loane and Roger Watson to Standard Oil Co.

Insecticidal composition, comprising dihalogenated 3,6-dinitro carbazol, wetting agent and filler. No. 2,392,067. Herbert Schotte and Robert Ebert to Sherka Chemical Co. Inc.

Rust-preventive composition having wool-fat having its normally contained esters partially saponified with alkaline earth metal hydroxide; a solvent for wool-fat and wax, surface tension depressant, and homogenizer. No. 2,392,102. Paul Ruedrich to Tide Water Associated Oil Co.

Container closure having flexible, resilient sealing liner comprising firm, sealing layer deposited from aqueous liquid containing water-soluble glue-acid addition product, an insolubilizing agent and a plasticizer. No. 2,392,238. James Fankhanel to Crown Cork & Seal Co. Inc.

Lubricating oil composition comprising petroleum lubricating oil and to

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retard oxidation of composition an inhibitor such as results from reaction of a monohydroxy aliphatic alcohol with a condensation product of turpentine and phosphorus pentasulfide. No. 2,392,252. Robert May to Sinclair Refining Co.

Lubricating oil composition comprising petroleum lubricating oil and to retard oxidation, reaction product of zinc oxide and organic compound resulting from reaction of a monohydroxy aliphatic alcohol, with condensation product of turpentine and phosphorus pentasulfide. No. 2,392,253. Robert May to Sinclair Refining Co.

Asphaltic composition for use as roofing compound and possessing constant ductility characteristics throughout range of normal weather temperatures, said compound comprising mixture of petroleum residual oil and raw oil of drying and semi-drying oils. No. 2,392,813. Alexander Fewsmith to Panther Oil & Grease Mfg. Co.

Treating mixture of liquid hydrocarbon fuel and organolead compound to remove latter from mixture, which comprises adding anhydrous stannic chloride, and an adsorbent. No. 2,392,846. Maurice Friedman to the Secretary of War of the United States of America.

Herbicidal composition including member of class of 2.4-dinitro-6-secondary butyl-phenol and its water-soluble salts, and a carrier therefor. No. 2,392,859. Lloyd Meuli to The Dow Chemical Co.

Stable, non-emulsifiable sulphurized mineral oil comprising sulphurized mineral oil prepared by reacting oil with elemental sulphur and oil soluble sulphonate from alkali metal sulphonates, alkaline earth sulphonates and amine sulphonates, etc. No. 2,392,891. Joseph Wallace and Thomas Sharp to Standard Oil Co.

Insecticidal composition comprising 2,2-bis (p-chlorophenyl) 1,1,1-trichloroethane and a nicotine compound. No. 2,392,961. Charles Woodward, Florence Talley, Elmer Mayer and Ernest Beinhart to the Secretary of Agriculture of the United States of America.

Preservative composition for preventing sap stain and mold growth in green wood comprising mixture of sodium pentachlorphenate, borax, and modified soda. No. 2,392,987. Eugene Hill to Wyandotte Chemicals Corp.

Insulating a flexible conductor, said conductor constituting anode in electrophoretic assembly, comprising electrophoretically depositing upon conductor, a mixture of finely divided refractory inorganic insulating material of kaolinite and talc and insulating organic binder. No. 2,393,068. Samuel Ruben.

Controlling weeds which comprises contacting weed with aqueous solution of ammonium trichloroacetate. No. 2,393,086. Euclid Bousquet to E. I. du Pont de Nemours & Co.

Wax-containing mineral oil and to reduce pour point a product obtained by reacting aromatic hydrocarbon with aliphatic aldehyde in presence of Friedel-Crafts type catalyst to produce a resinous product, acylating resultant product. No. 2,393,181. Louis Mikeska to Standard Oil Development Co.

Making adhesive material by treating insoluble dried blood from fertilizer blood and feeding blood. No. 2,391,387. Lawrence Bradshaw and Charles Stachel to The Borden Co.

Making friction element which comprises heating heat-polymerizable vegetable drying oil, mixing drying oil as bonding agent with friction material, forming into friction element shapes. No. 2,391,416. Clinton Hart and Ray Spokes to American Brake Shoe Co.

Quick setting cement comprising 40 to 80 per cent of solid water insoluble inert material, 10 to 35 per cent of alkalinous acid phosphate, 10 to 35 per cent of dead burned magnesite, and 0.5 to 5 per cent of a water soluble alkalinous fluoride. No. 2,391,493. Eugene Wainer and Allen Salomon to The Titanium Alloy Manufacturing Co.

Anti-seize paste composition for sealing metal joints exposed to action of gasoline, comprising highly polymerized blown castor oil, soap selected from zinc and calcium soaps of saturated aliphatic acids, and neutral light mineral oil. No. 2,391,504. Arthur Parker to The Parker Appliance Co.

Alkaline detergent composition for cleaning tin, comprising alkali-metal metasilicate, alkali-metal perborate, water-soluble salt of zinc and inhibitor of group consisting of water-soluble salt of magnesium and an alkali-metal silicate. No. 2,391,647. Charles Schwartz.

Dielectric comprising paper impregnated with chlorinated aromatic hydrocarbon containing non-explosive aromatic compound containing benzene ring having a nitro group substituted, etc. No. 2,391,685. Lawson Egerton to Bell Telephone Laboratories, Inc.

Dielectric element comprising paper containing bentonite the exchangeable hydrogen ions of which have been replaced in part by metal ions, said paper being impregnated with chlorinated aromatic hydrocarbon. No. 2,391,686. David McLean to Bell Telephone Laboratories, Inc.

Electrical insulating element comprising body of paper fibres containing lignin and impregnated with halogenated aromatic hydrocarbon. No. 2,391,687. David McLean to Bell Telephone Laboratories, Inc.

Condenser dielectric comprising chlorinated aromatic hydrocarbon which tends to form hydrogen chloride at elevated temperatures and compound of calcium with acidic constituents of gum arabic. No. 2,391,688. David McLean to Bell Telephone Laboratories, Inc.

Water dispersible radiator stop-leak composition for automotive cooling systems and like, comprising calcium salt of ligno-sulphonic acid and ground asbestos. No. 2,391,737. Arthur Pabst to Socony-Vacuum Oil Co. Inc.

Flame retarding thermoplastic bituminous composition for use as protective coating for building members and when exposed to direct flame, forming on surface thereof a carbonaceous ash film to form air seal covering underlying bituminous material to prevent rapid propagation of flame, consisting of bituminous material selected from natural asphalts, gilsonite, steam reduced and air blown asphalts from petrolum residua, coal tar pitches, stearine pitches, and having incorporated mixture of barium soap and zinc soap. No. 2,391,749. Purdum Snyder to H. H. Robertson Co.

Flame retarding thermoplastic bituminous composition. No. 2,391,750. Purdum Snyder to H. H. Robertson Co.

Flame retarding thermoplastic bituminous composition. No. 2,391,751. Purdum Snyder to H. H. Robertson Co.

Lubricating composition having grease structure made by heating mixture comprised of lubricating oil and silver soap of higher fatty acid. No. 2,391,842. John Morgan to Cities Service Oil Co.

*Textiles

Thermal fabric comprising woof of chenille yarn and insulated wire bound together by knitted warp threads, said wire being knitted to provide a heating element. No. 2,392,470. Richard Fitz Maurice to Therm-A-Mode Co.

Treatment of wet spun protein products. No. 2,392,582. George de Kadt.

Finishing pile fabric, comprising back-filling pile fabric with composition comprising dispersion in aqueous solution of fixed caustic alkali, alkali-soluble water-insoluble cellulose hydroxy-alkyl ether and rubber latex, etc. No. 2,391,867. James Clark to Sylvania Industrial Corp.

Treating textile goods which comprises passing goods impregnated with alkaline solution into one end of enclosing J chute to form bulk of packed goods in chute, heating goods to obtain action of alkaline solution upon goods. No. 2,391,905. Hans Kauffmann, Edward Shanley and Robert McEwen to Buffalo Electro-Chemical Co. Inc.

Treating cellulosic textile materials to render them receptive to acid and chrome dyes while retaining their affinity for direct dyes which comprises impregnating cellulosic textile material with aqueous solution of pH value within 1.6 to 3.0 and which contains formaldehyde, acidic catalyst, and water-soluble salt of a water-soluble tertiary hydroxy-alkylamine. No. 2,391,942. William Burke to E. I. du Pont de Nemours & Co.

Producing fabric having crinkled texture comprising associating together in same direction in fabric, yarns of thermoplastic material and yarns of non-thermoplastic material, introducing moisture, pulling-out fabric in direction of said associated yarns, etc. No. 2,391,950. Cyril Croft, Walter Hindle, and Robert Pinault to Celanese Corp. of America.

Apparatus for production of artificial filaments comprising spinneret, filter, and liquid pump for transferring artificial filament-forming material in non-pulsating flow through filter and to spinneret, improvement which comprises second liquid pump located between filter and spinneret. No. 2,391,973. Archibald Hunter to E. I. du Pone de Nemours & Co.

Producing impervious textile hose, which comprises, forming coating of thin continuous film of rubber latex on a sheet of thin textile fabric of vegetable fibres. No. 2,392,967. Mark Balkin to The Sillick Holding Co. Ltd.

Bleaching goods composed of cellulose, regenerated cellulose, and artificial silks, and which contain portions dyed with naphthol dyes, which comprises treating goods with alkaline active oxygen bleaching solution having initial pH value of less than 9.0 and containing freshly precipitated magnesium compound possessing latent alkalinity suspended therein to render dye fast to active oxygen bleaching solutions. No. 2,391,710. Hans Kauffmann and Paul Margulies to Buffalo Electro-Chemical Co. Inc.

*Water, Sewage, and Sanitation

Conditioning water for steam generation, which comprises incorporating with water a heavy metal compound selected from colloidal oxides, colloidal hydroxides, and water soluble salts capable of forming colloidal oxides and hydroxides, and incorporating with water colloidal silica to establish a colloidal silica-heavy metal oxide ratio. No. 2,391,895. Lewis Gunderson to Dearborn Chemical Co.

Preparing water-softening material which comprises treating coffee particles with acid to acidify without physical disintegration and thereafter soaking coffee particles in aqueous solution of alkaline alkali metal compound. No. 2,391,951. Svein Dahl-Rode.

Method and apparatus for treating sewage. No. 2,391,494. James Walker to The American Well Works.

Water treating apparatus comprising slurry chamber having bottom and upstanding boundary wall, mechanical agitator in chamber, etc. No. 2,391,697. Walter Green to Infilco Inc.

Sewage solids cutting and straining device. No. 2,391,704. Walter Hughes to Infilco Inc.

Filter plant comprising reception unit receiving water to be filtered and plurality of filtering units containing filter beds of discrete granular material. No. 2,391,716. Robert Koupal to Infilco Inc.

Agricultural

Winterizing vegetable oil, including chilling and separating solid material therefrom, improvement of adding lecithin to refined oil prior to chilling. No. 2,393,744. Leo Brown to Industrial Patents Corp.

Biochemical

Purification of carotene in water insoluble solvent contaminated with chlorophyll and xanthophyll. No. 2,394,278. Monroe Wall and Edward Kelley to the Secretary of Agriculture of the United States of America.

Purification of carotene in water thoic acid arylides by reacting beta hydroxy naphthoic acid with corresponding aromatic amine in inert organic solvent in presence of condensing agent, improvement which comprises carrying out condensation in presence of surface active agent. No. 2,394,279. Robert Weiss and Andrews Wintringham to American Cyanamid Co.

Purifying wood sugar solutions obtained from cellulose material by hydrolysis with dilute acids, which comprise concentrating solutions to specific gravity from 1.2 to 1.4 and separating resinous constituents from sugar solution. No. 2,394,334. Heinrich Scholler.

Vitamin A, carrier for vitamin, propyl gallate in carrier, and beta-aminoethyl alcohol bound to glycerophosphoric radical to make propyl gallate an effective stabilizer No. 2,394,456. John Korner and Horatio Loomis to Silmo Chemical Corp.

Obtaining products derived from blood consisting of oxalic acid and soluble salt of oxalic acid and blood. No. 2,394,566. Harry Smith and Walter Seegers to Parke, Davis & Co.

Cellulose

Preparation of cellulose for esterification to ester of lower fatty acid of improved heat stability and haze characteristic. No. 2,394,370. Robert Darling to Hercules Powder Co.

Riffler for treating stock of cellulose materials having sluice trough and plurality of riffle units disposed therein. No. 2,394,378. William Henry to Hercules Powder Co.

Improving properties of cellulosic materials, which comprises reacting

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materials with aliphatic hydrocarbon carbylamine containing at least four carbon atoms. No. 2,394,537. Henry Dreyfus; Claude Bonard administrator of said Henry Dreyfus, deceased.

Ceramics

Glass having power factor less than .07%, dielectric constant greater than 5, and consisting of compounds of lead, aluminum, boron and silicon. No. 2,393,448. William Armistead, Jr. to Corning Glass Works.

Glass having power factor less than .07%, dielectric constant greater than 4, and consisting of compounds of barium, aluminum, boron and silicon. No. 2,393,449. William Armistead, Jr. to Corning Glass Works.

Glass having power factor less than .07%, dielectric constant greater than 4, and consisting of compounds of lead, barium, aluminum, boron and silicon. No. 2,393,450. William Armistead, Jr. to Corning Glass Works.

Envelope for mercury vapor arc lamp comprising silicate glass envelope having on inner surface a transparent vitreous layer of phosphate glass which consists of P_2O_5, Al_2O_3, Ce_2O_3, and oxide of metal of second periodic group having atomic weight not exceeding 138. No. 2,393,469. Joseph Hooley to Corning Glass Works.

Admixture for concrete mix, mortar and like comprising 1¼% of sodium silicate, ½% of calcium chloride, ½% of potassium alum, and 1¼% of diatomaceous earth. No. 2,393,597. John Drummond.

Producing dielectric material which comprises mixing titanium dioxide and oxide of calcium to form calcium titanate with excess of calcium oxide, and firing to vitrification. No. 2,394,030. Eugene Wainer to The Titanium Alloy Manufacturing Co.

Treating strips of ferrous magnetic material to provide electrically insulating film on surface, comprising applying to surfaces a refractory composition comprising magnesium oxide, silica, calcium hydroxide. No. 2,394,047. Howard Elsey and Clifford Horstman to Westinghouse Electric Corp.

Producing mineral wool in pellet form, which consists in subjecting molten mineral to high velocity steamjet projected against stream of molten mineral in direction transverse of direction of flow of said stream, etc. No. 2,394,155. Edward Cusick.

Refractory comprising chrome ore, magnesium oxide and iron oxide. No. 2,394,304. Raymond Griffith to E. J. Lavino & Co.

Vitreous composition in production of colored fibers by attenuating process comprising alkali-free glass containing vanadium oxide. No. 2,394,493. Robert Schoenlaub to Owens-Corning Fiberglas Corp.

Opal or opalescent glassware composition having oxide content which is as follows: SiO_2, Al_2O_3, Na_2O K_2O, CaO, BaO, PbO; F, B_2O_3, AS_2O_3, P_2O_5. No. 2,394,502. Woldemar Weyl and Norbert Kreidl to Monsanto Chemical Co.

Making electrical resistor which comprises applying to wire-wound electrically insulating core a thin clay slip, drying, applying to clay-coated wire-wound core, enamel slip containing PbO, ZnO, B_2O_3, alumina, and silica, and drying and firing enamel slip. No. 2,394,591. Burton Bricker to E. I. du Pont de Nemours & Co.

Apparatus for stirring pool of molten glass contained in tank furnace, stirring implement having portion to be immersed in molten pool, etc. No. 2,394,893. Wilbur Brown to Libbey-Owens-Ford Glass Co.

Coatings

Coating composition comprising a 36 per cent butyl formate dispersion of polychloroprene, diluted with gasoline to produce stable coating composition adherent to vulcanized and unvulcanized natural rubber. No. 2,393,495. William Tann to The Firestone Tire & Rubber Co.

Preparing colored albino asphalt emulsions to form fade—and disintegration—resistant asphaltic coatings, steps of incorporating oleophilic cation active agent into albino asphalt before emulsification, and emulsifying with aqueous solution containing free ammonium hydroxide and ammonium salt of a detergent-forming acid. No. 2,393,573. Harry Sommer to Shell Development Co.

Producing dyed adherent corrosion resistant coating on zinc and cadmium comprising subjecting same to aqueous acidic solution consisting of water soluble chromium compound, compound selected from formic acid and soluble formates, subjecting same to aqueous solution of a water soluble organic dye. No. 2,393,640. Vernon King to Rheem Research Products Inc.

Producing adherent corrosion resistant coating on zinc and cadmium comprising subjecting same to water soluble chromium compound and compound easily oxidized by chromic acid and selected from formic acid and soluble formates and anions of another mineral acid, etc. No. 2,393,663. Robert Thomas and Charles Ostrander to Rheem Research Products Inc.

Producing adherent corrosion resistant coating on zinc and cadmium, comprising subjecting same to water soluble chromium compound, compound easily oxidized by chromic acid and selected from formic acid and soluble formates, compound selected from nitric acid and soluble salts thereof, and compound selected from sulfuric acid and soluble salts thereof. No. 2,393,664. Robert Thomas and Charles Ostrander to Rheem Research Products Inc.

Producing adherent corrosion resistant coating on metals of group of zinc, iron, steel, copper, copper base alloys and cadmium, comprising subjecting same to water soluble chromium compound and compound easily oxidized by chromic acid and selected from formic acid and soluble formates and water soluble iron salt, subjecting coated metal to acid which will impart black color to coating. No. 2,393,665. Albert Taylor to Rheem Research Products Inc.

Coating composition comprising water-in-oil type emulsion of a drying oil modified alkyd resin and granular exfoliated micaceous material. No. 2,393,874. Floyd Trent to William Geyer and James Donnelly.

Producing integral corrosion resisting coating on surface selected from zinc, cadmium, and copper comprising subjecting same to aqueous dip consisting of water, a water-soluble chromium compound, and zinc chloride. No. 2,393,943. Robert Thomas and Charles Ostrander to Rheem Research Products Inc.

Coating composition containing chlorine-containing resin and, as inhibitor of deterioration, a ketone-soluble resinous ester of a dicarboxylic acid and an aryl tertiary dialkylolamine. No. 2,394,010. Richard Quarles to Carbide and Carbon Chemicals Corp.

Prolonging active life of aqueous solution comprising acid phosphate for producing protective phosphate coating on zinc, cadmium and their alloys which comprises maintaining free ferrous metal in contact with solution. No. 2,394,065. George Jernstedt and John Lum to Westinghouse Electric Corp.

Protecting metal articles during shipment, handling, storage, process of applying to article a molten composition comprising following ingredients: ethyl cellulose (45.5% to 50% ethoxyl, 7 to 200 centipoises viscosity), plasticizer having solvent action on ethyl cellulose, plasticizer which exhibits characteristic of exuding to surface of ethyl cellulose compositions containing it, thermoplastic resin compatible with ethyl cellulose. No. 2,394,101. Herman Phillips and Philip Robb to Hercules Powder Co.

Fluid coating composition for coating fibrous sheet materials consisting of aqueous suspension of particles of filler from minerals and pigments and of amylolyzed starch produced by action of amylolytic enzyme on raw starch. No. 2,394,233. William Craig to R. T. Vanderbilt Co. Inc.

Flexible, non-tacky, slick, dry, thermo plastic coating as adhesive coating on paper or like to cause paper to adhere to surface when applied with coating in hot melted condition and permitted to solidify, consisting of stearic acid, ethyl cellulose, and paraffin wax. No. 2,394,254. Thomas Walter Noble.

Making wrinkle finish comprising mixing resin with raw China-wood oil, and heating, adding metallic drier, adding remainder of resin and dissolving same, rapidly chilling liquid and then adding thinners to produce spray varnish having low viscosity and superior spray qualities, and thereafter adding pigment paste and inert paste selected from magnesium carbonate, diatomaceous earth, and asbestine to produce fine texture enamel. No. 2,394,498. William Waldie to New Wrinkle, Inc.

Making wrinkle varnish composition which comprises heat bodying mixture of oiticica oil and unblown nonconjugated double-bonded drying oil and adding resin selected from run natural resins requiring running for production of oil-solubility, rosin-modified alkyd resins, and oil-soluble phenol-aldehyde resins, and oil-soluble phenol-aldehyde resins which do not evolve formaldehyde and water on cooking. No. 2,394,499. William Waldie to New Wrinkle, Inc.

Making wrinkle varnish base which consists in heat reacting polyglycerol modified drying oil obtained by heating unblown non-conjugated drying oil with polyglycerol, with oil-soluble resin selected from run natural resins requiring running for production of oil solubility, rosin modified alkyd resins, and phenol-aldehyde resins. No. 2,394,500. William Waldie to New Wrinkle, Inc.

Tubular ferrous electrode for underwater cutting having coating comprising resin base material in lacquer form which is polyvinyl chloride and arc stabilizing material from lime, talc, barium carbonate, and iron oxide, thickness of coating being to reduce the burning rate of electrode. No. 2,394,550. Cyril Jensen.

Liquid coating composition for containers to prevent adherence thereto of tacky, polymerization products of iso-mono-olefins and poly-olefins, which consists of low temperature copolymer of isobutylene and butadiene, petroleum wax, Dixie clay, oleic acid, triethanolamine, petroleum sulfonate soap and water. No. 2,394,616. Fred Knoth, Jr. and Michael Pavlick to Standard Oil Development Co.

Coated article having applied dried film of benzene-soluble product resulting from hydrogenation of one of resinous polymerized cyclopentadiene, methyl cyclopentadiene, methyl cyclopentadiene and copolymer of cyclopentadiene and methyl cyclopentadiene in admixture with sulfur containing rubber vulcanizing agent. No. 2,394,816. Frank Soday to The United Gas Improvement Co.

Forming reflective coating on surface of glass base comprising cleaning surface, placing base in chamber, evacuating chamber, depositing by thermal evaporation a layer of aluminum upon surface, breaking vacuum to allow air to contact layer to oxidize latter, etc. No. 2,394,930. Daniel McRae to Eastman Kodak Co.

Dyestuffs

Fibers of organic fiber-forming materials soluble in organic liquids, said fibers being colored with dye having therein monovalent aliphatic radical which is free from sulphonic and carboxylic groups. No. 2,393,652. Henry Olpin, Edmund Stanley and Christopher Argyle to British Celanese Ltd.

Production of dyestuff intermediates which comprises reacting heterocyclic nitrogen compound with ortho ester of monocarboxylic acid of formula described in patent, etc. No. 2,394,067. John Kendall and Douglas Fry to Ilford Ltd.

Dyestuffs and dyestuff intermediates. No. 2,394,068. John Kendall and Douglas Fry to Ilford Ltd.

Dyestuff intermediates. No. 2,394,069. John Kendall and Harry Edwards to Ilford Ltd.

Trisazo diphenyl dyestuffs. No. 2,394,114. Arthur Siebert to General Aniline & Film Corp.

Disazo dyestuffs. No. 2,394,246. Hans Lecher, Robert Parker and John Denton to American Cyanamid Co.

Azo dyestuffs. No. 2,394,258. Robert Parker and John Denton to American Cyanamid Co.

Dyeing yarns and other shaped articles comprising vinyl polymers, comprising treating article with aqueous dye bath containing suspension dyestuff, in presence of a water-insoluble, normally solid organic compounds from a-naphthol, b-naphthol, thio-b-naphthol, 2.4-dichloro-a-naphthol, etc. No. 2,394,688. Karl Heyman to American Viscose Corp.

Dyeing yarns and other shaped articles comprising vinyl polymers, comprising treating article with aqueous dye bath containing suspension dyestuff, in presence of a water-insoluble, normally solid organic compound from o-hydroxyacetophenone, benzophenone, p-hydroxybenzophenone, etc. No. 2,394,689. Karl Heyman to American Viscose Corp.

Equipment

Fire extinguishing apparatus, combination of conduit, container releasably confining fire extinguishing medium, two-way-outlet means operatively connected to container, etc. No. 22,721. Walter Freygang to Specialties Development Corp.

Drying apparatus for iron ores and like, comprising upright stack circular in section, ore inlet opening in upper portion of said stack, etc. No. 2,393,227. Ellery Anderson.

Electrolytic cell for electrolysis of fused salt baths which comprises vessel for confining fused salt, a hood for collection of molten metal which is submerged in fused salt, said hood having top portion beneath which non-anodic gas and metal are collected, etc. No. 2,393,330. Robert McNitt.

From Official Gazette—Vol. 582, Nos. 4, 5—Vol. 583, Nos. 1, 2 (Jan. 22-Feb. 12)—p. 671

Deaerator. No. 2,393,393. John McDermet to Elliott Co.

Thermohydrometer. No. 2,393,522. Leo Edelmann.

Thermohydrometer. No. 2,393,523. Leo Edelmann.

Pressure reduction valve for bottled gas systems. No. 2,393,545. Henry Martin, Jr. to Standard Oil Development Co.

Gauging apparatus for measurement of vacua. No. 2,393,552. James Morpeth to British Food Manufacturers' Research Association.

Apparatus for analyzing hydrocarbon gas, comprising test chamber; an anode and cathode with a gas-sensitive, low-work-function surface, located in chamber; means for measuring electron emission from cathode, etc. No. 2,393,650. Herbert Metcalf to Consolidated Engineering Corp.

Coke-oven wall construction. No. 2,393,658. Walter Rueckel to Koppers Co. Inc.

Apparatus for applying liquid treating medium to tenuous articles. No. 2,393,678. Hugh Graham to The American Steel and Wire Co. of New Jersey.

Diaphragmless cell for electrolysis of chloride fusions heavier than magnesium to produce magnesium and chlorine. No. 2,393,685. Basil Hunt to The Mathieson Alkali Works, Inc.

Sludge collecting mechanism for settling tanks including endless chain means, aligned sprockets spaced from one another supporting said chain means, etc. No. 2,393,725. James Walker to The American Wheel Works.

In drying system; a source of hot gases; two cyclone collectors through which gases and material being dried flow in a series, etc. No. 2,393,766. Charles Gordon to Combustion Engineering Co. Inc.

Temperature control for heat exchange units. No. 2,393,941. Robert Stewart to Crown Cork & Seal Co. Inc.

Pressure vessel to stand temperatures markedly below normal minimum atmospheric temperatures, comprising sheet metal pressure shell of spherical form, layer of insulating material within pressure shell and supported thereby; and gas-tight thin membrane of metal alloy retaining its strength at as low as —260° F. No. 2,393,964. Harry Boardman to Chicago Bridge & Iron Co.

Apparatus for heating oil and separating moisture therefrom comprising expansion chamber having double wall with space between inner and outer surfaces thereof, means for introducing heating medium into space between surfaces of double wall, etc. No. 2,393,965. Southwick Briggs, Walter Bauer, Walter Ewbank and Roscoe Porter to Briggs Clarifier Co.

Multi-cell flotation machine, in which pulp from preceding cell is delivered through conduit directly to impeller of succeeding cell. No. 2,393,976. Arthur Daman and Leland Logue to Mining Process and Patent Co.

Continuous centrifugal apparatus for separating heavy liquid from light solid, comprising rotable bowl being closed, inwardly extending annular conical lip at open end, etc. No. 2,394,015. August Henry Schutte.

In packed tower, a tubular element enlarged intermediate its ends to form chamber to be filled with discrete particles of packing material of smaller size than internal cross-sectional area of tubular element, etc. No. 2,394,023. Elizabeth Strickland to Chemical Developments Corp.

Tower for countercurrently contacting vapors and liquid comprising vertical shell having series of vertically spaced contact sections each including multiplicity of parallel contiguous columns defined by series of intersecting vertical partitions disposed across shell, etc. No. 2,394,133. Merle Zimmerman.

Control system for controlling elevation of interface between two immiscible fluids of different specific gravities and different specific electrical resistivities contained in tank. No. 2,394,220. Cary Wagner to Phillips Petroleum Co.

Means for contacting gas and liquid which comprises vertical cylinder into which gaseous fluid is adapted to flow, means for depositing liquid in film upon inner surface of cylinder and allowing same to gravitate downwardly. No. 2,394,293. Arden Garrell Deem.

Apparatus for separating heavier and lighter components of gas, comprising chamber, means for maintaining opposite walls of chamber at different temperatures, means for rotating chamber, and for drawing lighter component off from axial portion, and heavier component off peripheral portion, of chamber. No. 2,394,357. Norman Breese to Westinghouse Electric Corp.

Apparatus for measuring specific gravity of process liquid, in combination, first chamber containing body of said process liquid, second chamber containing body of reference liquid, etc. No. 2,394,549. Wilfred Howe to The Foxboro Co.

Apparatus for controlling pressure of furnace gases. No. 2,394,595. Fred Corbin and Harry Netzhammer.

Drying apparatus comprising three elongated tubular columns of different diameters arranged in concentric spaced relation, outer and intermediate columns being joined together at their lower ends, etc. No. 2,394,605. Harold Friedman.

Apparatus for heating catalyst chambers which comprises conversion tube and heater therefor. No. 2,394,631. Frederick Neuhart to Phillips Petroleum Co.

Evaporating plate composed of porous material adapted to absorb water, comprising lower portion to be inserted in body of water, and upper portion extending upwardly and outwardly therefrom, outer terminal edge having contour conforming to line of advance of water of absorption from body. No. 2,394,698. Otto Kuenhold to Monmouth Products Co.

Liquid feeding apparatus comprising rigid outer plurality of flexible liquid containers in casing, separate filling discharge and vent connections for each container to maintain container fully extended axially, etc. No. 2,394,852. Robert Goddard, one-half to The Daniel and Florence Guggenheim Foundation.

Liquid storage tank comprising closed casing discharge connection having branch pipes terminating adjacent spaced side, etc. No. 2,394,853. Robert Goddard, one-half to The Daniel and Florence Guggenheim Foundation.

Liquid level responsive device comprising liquid container having liquid therein, first resistance element which changes in electrical conductivity upon changes in temperature, etc. No. 2,394,885. Albert Baak to Minneapolis-Honeywell Regulator Co.

In dust collector and separator, an upright casing, bottom diffusing cone and inverted cone of less diameter than casing spaced above first cone forming centrifugal separation chamber, etc. No. 2,394,923. William Little.

Refractometer. No. 2,394,949. Harold Straat to Bausch & Lomb Optical Co.

Device for indicating deviation of highly polished metal surface from predetermined standard surface comprising transparent member, and semi-transparent film of alloy comprising nickel, chromium, and iron, adhering to reference surface, said film reducing light transmission through transparent member. No. 2,394,951. Arthur Turner to Bausch & Lomb Optical Co.

Explosives

Introducing into combustion chamber of internal combustion engine a solution of ammonium nitrate in liquid ammonia and effecting therein explosive combustion of ammonia. No. 2,393,594. Clyde Davis to E. I. du Pont de Nemours & Co.

Recovery of pentaerythritol tetranitrate from mixtures comprising pentaerythritol tetranitrate and trinitrotoluene which comprises dissolving mixture in acetone, filtering, adding water up to beginning of separation of oil-like product, etc. No. 2,394,223. Joseph Wyler to Trojan Powder Co.

In manufacture of granular explosives, controlling treatment of explosive grains with modifying agent. No. 2,394,449. Milton Herzog to Olin Industries, Inc.

Food

Top fermentation of beer. No. 2,393,518. Stephen Clarke.

Preparing fruit concentrate which comprises dehydrating fruit in fluid state, adding water-soluble salt of carboxymethyl cellulose, and dehydrating to dryness. No. 2,393,561. Ramon Perech.

Preparing concentrate of coffee extract which comprises adding water-soluble salt of carboxymethyl cellulose to extract and evaporating water. No. 2,393,562. Ramon Perech.

In refrigeration and preservation of perishable foods subject to deterioration by bacterial and fungus growth, in which solid carbon dioxide is refrigerant and chlorine dioxide is preservative, improvement which comprises reacting gaseous carbon dioxide, resulting from subliming of solid carbon dioxide refrigerant, in presence of water vapor, with inorganic chlorite to form chlorine dioxide. No. 2,394,064. Willis Hutchinson to The Mathieson Alkali Works, Inc.

Batter mixture for baking comprising mixture of neutral starch, lactide, and calcium carbonate. No. 2,394,791. Robert Lloyd and Ben Buchanan to American Maize-Products Co.

Coating cheese, which comprises applying to surface of cheese a waxy mixture containing petroleum wax and reaction product of alkylolamine with acylating substance which replaces reactive acylatable hydrogen atoms with lypophyllic group. No. 2,394,833. Harland Young and David Rubinstein to Industrial Patents Corp.

Inorganic

Chlorine is absorbed from gaseous mixture comprising chlorine and hydrogen chloride by solvent action thereon of carbon tetrachloride, improvement which consists in conducting absorption in contact with containing surfaces composed of carbon having pores sealed with synthetic resin selected from furfural polymers, phenol-formaldehyde resins, etc. No. 2,393,229. Frederic Bouchard to Hercules Powder Co.

Preparation of thionyl chloride which comprises reacting carbon tetrachloride with sulfur dioxide in liquid phase and at pressure of fifteen to two hundred atmospheres in presence of aluminum chloride as catalyst. No. 2,393,247. Alban Hallowell and Gordon Vaala to E. I. du Pont de Nemours & Co.

Electrolysis of ferrous chloride liquor containing free hydrochloric acid. No. 2,393,582. William Agnew to National Lead Co.

Making hard, granulated highly porous magnesium silicate adsorbent for percolation treatments. No. 2,393,625. Ogden Fitz Simons to Floridin Co.

Electrolysis of chloride fusions heavier than magnesium in a diaphragmless cell to produce magnesium and chlorine No. 2,393,686. Basil Hunt and Robert MacMullin to The Mathieson Alkali Works, Inc.

Stabilizing alkaline earth metal peroxide which comprises impregnating peroxide with dilute solution of ammonium stearate to form water insoluble film upon surface of peroxide particles. No. 2,393,891. Lynn Dawsey and Hans Rudolph to Buffalo Electro-Chemical Co., Inc.

Liberation of magnesia of magnesium silicates which comprises mixing finely divided burned and unburned calcic carbonate and dolomitic materials with mineral magnesium silicate, and calcining. No. 2,393,920. Walter MacIntire to American Zinc, Lead & Smelting Co.

Modifying hydrated silicate which consists in subjecting silicate to contact with chloride chosen from silicon and titanium. No. 2,394,040. Thomas Callinan to General Electric Co.

Electron emissive electrode comprising metal base in combination with activating thorate of alkaline earth metal. No. 2,394,095. Sidney Noble and Harold Rooksby to General Electric Co.

Dehydrating aqueous alkali metal hydroxide liquors while preventing corrosion of dehydrating equipment by hydroxide and consequent contamination which comprises mixing oil with aqueous solution of alkali metal hydroxide and heating to evaporate solution and cause precipitation of solid hydroxide, and producing formation of corrosion resistant film about hydroxide granules. No. 2,394,244. Vaman Kokatnur to Autoxygen Inc.

Manufacture of oleum in system including catalytic SO_2 oxidation plant forming a hot SO_3 exit gas, oleum product production stage, intermediate strength oleum production stage, and sulfuric acid production stage. No. 2,394,426. Bernard Carter to General Chemical Co.

Recovery of waste sulphuric acid liquors. No. 2,394,470. James O'Shaughnessy to National Lead Co.

Obtaining potassium chloride and magnesium oxide from carnallite. No. 2,394,570. Lucien Charles Sturvelle.

Producing red iron oxide. No. 2,394,579. Joseph Ayers to C. K. Williams & Co.

Removing iron and cerium from water-soluble lanthanum salts. No. 2,394,586. Albert Ballard and Lawrence Martinson to Eastman Kodak Co.

Production of dispersion of sodium in inert liquid which comprises melting sodium in inert liquid, agitating mass to form dispersion, adding higher fatty acid, and cooling dispersion. No. 2,394,608. Virgil Hansley to E. I. du Pont de Nemours & Co.

Producing titanium dioxide by reaction of gaseous oxygen with titanium halide wherein suspension of titanium dioxide in reaction gases is produced No. 2,394,633. Alphonse Pechukas and George Atkinson to Pittsburgh Plate Glass Co.

Preparing aluminum sulphate involving treating aluminum ore with sulphuric acid until ore is digested and solution of aluminum sulphate

is formed, settling insoluble material, and removing settled material. No. 2,394,660. Robert Brown to Hercules Powder Co.

Hygroscopic salt solution comprising halide of calcium and lithium and having incorporated as inhibitor for retarding corrosion of ferrous metals, an arsenite. No. 2,394,758. Alvin Edmunds to The Dow Chemical Co.

Making aluminum coated mica particles which comprises mixing mica particles and aluminum powder and subjecting mixture to impaction force by movable element to wipe mica on its surfaces with aluminum and coat mica. No. 2,394,843. Giles Cooke and Frank Gavin to Crown Cork & Seal Co. Inc.

Manufacturing magnesium chloride from dolomitic rock. No. 2,394,863. Harald Lundin to International Minerals & Chemical Corp.

Medicinal

Halogen derivatives of Schiff's bases having a bactericidal action. No. 2,393,271. James Shelton.

Inhibiting bacterial action which comprises contacting bacteria with nuclear mono-substituted-4-aminobenzoic acid selected from 3-chloro-4-aminobenzoic acid, 2-chloro-4-aminobenzoic acid, etc. No. 2,393,673. Orville Wyss and Bernard Ludwig and Martin Rubin to Wallace & Tiernan Products, Inc.

Medicinal remedy for application to nasal mucosa to produce shrinkage without producing affect upon central nervous system, comprising compound from beta-phenyl, beta-alkyl isopropyl amines. No. 2,394,092. Fred Nabenhauer to Smith, Kline & French Laboratories.

Gastro-intestinal mediament comprising synthetic magnesium silicate having molecular ratio, MgO:SiO2, within range of 1:3·2-1:4·3, and calcium carbonate. No. 2,394,107. Reuben Roseman and Harry Eisenberg to Charles Burton.

Barbituric compounds. No. 2,394,195. Samuel McElvain and Howard Burkett.

Disinfection, and destruction of bacteria, by halogen silver compounds in vapourous state at high degree of humidity. No. 2,394,325. Richard Muller.

Making physiologically active compounds comprising subjecting member of free and etherified phenols containing unsaturated side chain to organo-metal compound and isolating oestrogenic product. No. 2,394,565. Arthur Serini and Konrad Steinruck to Schering Corp.

Preparing dry, water-dispersable compositions of hormones which are difficultly soluble in water which comprises forming solution of hormone in organic solvent containing dissolved non-toxic water-soluble, crystallization retarding agent from hexamethylene tetramine, amide of nicotinic acid, dextrose and mannitol, and evaporating solvent from mixture, leaving dry, solid admixture of hormone. No. 2,394,628. Arthur Meyer to The Maltine Co.

Metallurgy, Ores

Separating metals from metallic materials consisting of tin and lead and containing copper and antimony which comprises forming anodes of such material, and electrolyzing anodes in bath consisting of water solution of free aromatic sulphonic acid and aromatic sulphonic acid salts of tin and lead, and which contains hydrochloric acid to prevent passivity of anodes. No. 2,393,239. Louis Deitz, Jr. to Nassau Smelting & Refining Co. Inc.

Manufacturing pure zirconium for photoelectric devices. No. 2,393,264. Harvey Rentschler and Donald Henry to Westinghouse Electric Corp.

Preparing magnetic materials comprising compacting powdered mixture composed of molybdenum, nickel and iron, heating compacted mixture in reducing atmosphere to sinter, powdering sintered material, adding powdered material to insulated Permalloy dust, and compacting mixture. No. 2,393,295. Robert Cross, Jr. and Joy Dillinger and Arthur Ogden to Western Electric Co. Inc.

Melting furnace for melting light alloys. No. 2,393,306. Walter Bonsack to The National Smelting Co.

Treating thin, elongated ferrous metal article which is in cold rolled condition, article being formed of ferrous metal substantially non-hardening by quenching methods, comprising passing elongated surface of article into contact with heat supplying medium to initiate recrystallization adjacent surface, etc. No. 2,393,363. John Gold and Clarence Foulke to National Steel Corp.

Apparatus for separation of metallic values, comprising: a rotatably supported cylindrical furnace provided with hollow trunnions for introducing gaseous fuel and for exhausting products of combustion, etc. No. 2,393,467. Albert Hanak.

Process for separation of metallic values which comprises: heating aqueous solution of caustic soda, continuously stirring solution while feeding it with mixture of sulfur and finely powdered speiss, etc. No. 2,393,468. Albert Hanak.

Permanent magnet composed of alloy steel consisting of chromium, carbon, beryllium, and iron. No. 2,393,488. Enrique Touceda and Ralph De Vries to Allegheny Ludlum Steel Corp.

Plating mixture of metals, consisting in passing electric current from magnetite anode to cathode through aqueous ammoniacal solution of mixture of metal-ammonia salts, to deposit metals on cathode. No. 2,393,516. Richard Burns to Indiana Steel & Wire Co.

Electroplating zinc, consisting in passing electric current from magnetite-surface anode to cathode, through aqueous ammoniacal solution of zinc-ammonia salt, to deposit zinc on cathode. No. 2,393,517. Richard Burns to Indiana Steel & Wire Co.

Can stock having ferrous base .010" thick or less, including .1% to 1% silicon, with balance of iron. No. 2,393,528. Norman Goss and Erwin Bowen to The Cold Metal Process Co.

Homogeneous projectile body comprising heat treated, stratified mixtures of compressed powdered metallic products, nose of body being soft, portion adjacent nose being of great hardness, and remainder of body being decrementally hard and incrementally tough. No. 2,393,648. Carl Martin.

Cold die working stainless steel stock having scale on surface produced by hot working and annealing under oxidizing conditions, comprising contacting scale with strongly alkaline water solution, lubricating stock and cold die working lubricated stock, with scale on stock. No. 2,393,675. James Fenner, Ronald Griffiths, and Arch Harris to The American Steel and Wire Co. of New Jersey.

Producing from its ore a metal selected from beryllium, magnesium, zinc, and cadmium, and oxide ores of which are reducible by carbon. No. 2,393,704. Henry Ogorzaly to Standard Oil Development Co.

Producing bright electro-deposited zinc which comprises plating zinc onto cathode from bath consisting of zinc sulfate, water, sulfuric acid and 20% to 24% of zinc sulfate, and being approximately half-normal in acidity from said sulfuric addition agent being triethylene tetramine. No. 2,393,741. John Bray and Robert Howard to Purdue Research Foundation.

Making electron discharge device comprising thermionic cathode and cold electrodes, one of which is secondary electron emitter consisting of sheet of silver-magnesium alloy in which silver is predominant, etc. No. 2,393,803. Herbert Nelson to Radio Corp. of America.

Bearing material formed of alloy comprising thallium and gold. No. 393,905. Franz Hensel to P. R. Mallory & Co. Inc.

Bearing formed of sintered and age hardened metal composition containing nickel, phosphorus, and copper, said composition characterized by high strength and hardness and absence of soft shell. No. 2,393,906. Franz Hensel and Earl Larsen to P. R. Mallory & Co. Inc.

Metallurgical furnace. No. 2,394,002. Harold Ness to Metallurgical Processes Co.

Producing comminuted metal of such chemical characteristics and particle size that when dusting occurs in certain atmospheres there is danger of explosion, which consists in subjecting massive metal to action of disintegrator to produce and remove from mass particles of size within given range, protecting particles, as they are produced, by volatile liquid hydrocarbon coolant. No. 2,394,052. Harold Hall and Alexander Knoll to Metals Disintegrating Co., Inc.

Producing rolls by melting an iron having normal content of carbon, silicon and manganese for chilled rolls in forced fuel feed furnace. No. 2,394,156. Fred Daniels to Mackintosh-Hemphill Co.

Etching zinc plates which consists in employing as anode a zinc plate having pattern to be etched by removal of exposed metal and introducing patterned plate to cathode within aqueous solution comprising sodium sulphate, ammonium thiocyanate, and water. No. 2,394,190. Albert Kreck.

Recovering tungsten from low-grade ore material containing that and as impurity, phosphorus, which comprises digesting ore material with solution of alkali metal compound, improvement which comprises mixing ore with lime and roasting ore-lime mixture before digesting. No. 2,394,362. Blair Burwell to United States Vanadium Corp.

Producing severed edge defined entirely by protective metal in composite metal article whose cross-section throughout is made up of base metal united to covering zone of protective metal. No. 2,394,383. Robert Hopkins to The M. W. Kellogg Co.

Maintaining high-carbon-steel tempered wire free from cold work strain at 300° to 600° F. to increase its ductility without changing its tensile strength and elastic limit. No. 2,394,434. Harold Elmendorf to The American Steel and Wire Co. of New Jersey.

Alloy consisting of magnesium, tin, manganese, and lead, said alloy being more resistant to chemical corrosion than alloy devoid of manganese. No. 2,394,451. Edward Hollman to The Eagle-Picher Co.

Producing tin plate tinned in predetermined areas only, which comprises applying to base plate in predetermined areas a flux which loses its fluxing properties on heating at temperature of tinning bath. No. 2,394,545. William Grupe to Interchemical Corp.

Aluminum base alloy containing copper and beryllium and method of making same. No. 2,394,546. Richards Harrington to General Electric Co.

Producing tool steel powder from contaminated tool steel grinding scrap. No. 2,394,578. John Wulff.

Processing ferrous metal wire or rod stock for reduction in gauge, consisting in cleaning stock in acid solution, immersing in alkali solution to neutralize residual acid, immersing stock in water bath of calcium hydroxide whereby there is acquired thereon non-abrasive coating of pure calcium hydrate. No. 2,394,620. William Leonard to The American Steel and Wire Co. of New Jersey.

Brass having high resistance to season cracking consisting of zinc, copper and silicon and comprising alpha brass grains together with additional microstructural constituent present at alpha grain boundaries. No. 2,394,673. Gerald Edmunds to The New Jersey Zinc Co.

Making metallic spheres which comprises compressing powdered metal into compact mass, placing mass on glass-like support and heating support and mass so that compacted material will fuse and sink into but not all way through glass-like support. No. 2,394,727. George Taylor to Carboloy Co. Inc.

Inhibitor composition for pickling ferrous metals comprising non-oxidizing pickling acid solution and condensation product of formaldehyde with reaction product of hydrogen sulfide and a melamine. No. 2,394,773. William Hill to American Cyanamid Co.

Inhibitor composition for pickling ferrous metals comprising non-oxidizing pickling acid solution and condensation product of formaldehyde with reaction product of hydrogen sulfide and substance from diethylene triamine, triethylene tetramine and triethylamine. No. 2,394,774. William Hill to American Cyanamid Co.

Neutral salt bath for heat treatment of ferrous metals consisting of alkaline earth metal chloride salt and titanium dioxide to convert alkaline earth metal oxide formed into neutral alkaline earth metal titanate. No. 2,394,777. Artemas Holden and Haig Solakian; said Solakian to said Holden.

Electro-refining nicked in electrolytic cell having anode compartment and cathode compartment separated by pervious diaphragm. No. 2,394,874. Louis Renzoni to The International Nickel Co., Inc.

Blackening stainless steel articles and products which includes, treating articles by immersing in molten salt bath consisting of sodium dichromate and potassium dichromate. No. 2,394,899. Irvine Clingan to The American Rolling Mill Co.

Alloy for effecting vacuum-tight seal to glass, said alloy comprising nickel, chromium, and balance iron. No. 2,394,919. Walter Kingston to Sylvania Electric Products, Inc.

Organic

Partial oxidation of aromatic hydrocarbons containing alkyl side-chain with aid of solid catalytic material, wherein catalytic material is mixed with 3-5 times its volume of material of no catalytic activity. No. 2,393,240. Henry Dreyfus; Claude Bonard administrator of said Henry Dreyfus, deceased.

Increasing ion exchange capacity of cation exchangers comprising treating organic cation exchanger containing sulphonic groups with water soluble compound of sulphur dioxide. No. 2,393,249. Eric Holmes to The Permutit Co.

Producing CHF_2CClF_2 which comprises heating C_2F_4 with anhydrous HCl at 150° C. to 400° C. in presence of carbon as a catalyst. No.

2,393,304. Anthony Benning, Frederick Downing and Roy Plunkett to Kinetic Chemicals, Inc.

Ester of 2,9-dimethyl-4,7-dithiosebacic acid. No. 2,393,327. Carl Langkammerer to E. I. du Pont de Nemours & Co.

Manufacturing fumaric acid from maleic anhydride-containing converter gases resulting from vapor phase catalytic oxidation of organic compound. No. 2,393,352. Leon Winstrom to Allied Chemical & Dye Corp.

Isomerisation of normal butane, consisting in subjecting normal butane to contact with catalyst consisting of aluminum chlorobromide. No. 2,393,357. Eric Fawcett and Eric Narracott to Anglo-Iranian Oil Co. Ltd.

Preparing dichlorethane which comprises reacting ethylene and chlorine within liquid bath of dichlorethane and in presence of ferric chloride acting as a depressant. No. 2,393,367. John Hammond, one-half to U. S. Industrial Chemicals, Inc., and one-half to Wyandotte Chemicals Corp.

Cyclic process for making butadiene which comprises passing acetaldehyde and ethanol over catalyst to form mixture including butadiene, unreacted acetaldehyde, and by-products. No. 2,393,381. Hartselle Kinsey, Theodore Kelly and Peter Ferrara to Carbide and Carbon Chemicals Corp.

1-hydroxy-3-amino-3-methyl butane. No. 2,393,483. Frank Soday to The United Gas Improvement Co.

Substance having formula described in patent and containing an ortho-arylene radical and an alkyl radical. No. 2,393,500. Edward Carr to The Firestone Tire & Rubber Co.

Compound having formula described in patent and containing an ortho-arylene radical, and hydrogen, alkyl radicals or hydroxyalkyl radicals. No. 2,393,507. Edward Carr to The Firestone Tire & Rubber Co.

Continuously chlorinating ethane which comprises mixing ethane and chlorine, dispersing mixture in 30% hydrochloric acid aqueous solution, subjecting mixture to influence of light. No. 2,393,509. Francis Archibald and Henry Mottern to Standard Oil Development Co.

Production of unsaturated ketones which comprises contacting vapors of condensable ketone with catalyst of alkali metal and alkaline earth metal salts of a weak, inorganic oxy acid of an amphoteric element. No. 2,393,510. William Bailey, Jr. and Walter Peterson to Shell Development Co.

Production of diacetyl from methyl ethyl ketone which comprises reacting methyl ethyl ketone with oxygen in presence of cuprous oxide supported on silicon carbide porous aggregates. No. 2,393,532. George Hearne, Merrill Adams and Vernon Buls to Shell Development Co.

Treatment of hydrocarbon mixture containing monoolefins consisting of normal butylenes and amylenes which comprises contacting mixture with catalyst, thereby converting mono-olefins to diolefins. No. 2,393,537. Hal Huffman to Union Oil Co. of California.

Making alkyl alpha-alkoxy-p-methoxyphenylacetate. No. 2,393,570. Miner Salmon and Martin Rubin to Wallace & Tiernan Products, Inc.

Ether of unsaturated alcohol and hydroxydihydronordicyclopentadiene. No. 2,393,608. Herman Bruson to The Resinous Products & Chemical Co.

Dihydronordicyclopentadienyl ethers of nitro alcohols. No. 2,393,611. Herman Bruson to The Resinous Products & Chemical Co.

Recovering pyridine bases from saturator-bath liquor of ammonium sulphate containing same. No. 2,393,666. Bernard van der Hoeven to Koppers Co., Inc.

Treating crude tar acid fraction including phenol with side chain group longer than methyl group. No. 2,393,699. Vittorio Molinari to Bakelite Corp.

Treating crude tar acid fraction containing alkylphenol ether. No. 2,393,700. Vittorio Molinari to Bakelite Corp.

Preparing alkyl (lower aliphatic acyl) aminocyanoacetate which comprises reacting alkyl isonitrosocyanoacetate with cold aqueous solution of water-soluble metal hydrosulfite and lower aliphatic acid anhydride. No. 2,393,723. Benjamin Tullar to Winthrop Chemical Co., Inc.

Preparing esters of acrylic and alpha-alkacrylic acids. No. 2,393,737. Newman Bortnick to Rohm & Haas Co.

alpha-Alkylacrolein diacylates selected from alpha-ethacrolein diacetate, alpha-ethacrolein dipropionate and alpha-ethacrolein dibutyrates. No. 2,393,740. Joseph Brant and Frederick Conklin to Eastman Kodak Co.

Organic cyanine base. No. 2,393,743. Leslie Brooker and Robert Sprague to Eastman Kodak Co.

Addition-rearrangement product of thiocyanic acid and 1,4-endomethylene tetrahydro-delta 2-fluorene, said product being an isothiocyanate. No. 2,393,746. Herman Bruson and Thomas Riener to Rohm & Haas Co.

Reaction products of dimethylol urea and a balogenated acetamide. No. 2,393,752. Gaetano D'Alelio to General Electric Co.

Reaction products of aldehydes and triazine derivatives. No. 2,393,754. Gaetano D'Alelio and James Underwood to General Electric Co.

Preparing hydroxyarylamino triazines. No. 2,393,755. Gaetano D'Alelio to General Electric Co.

Pyrolyzing ketenizable organic compounds such as acetic acid to produce ketene and other products which comprises pyrolyzing ketenizable compound in pyrolysis vessel constructed of non-catalytic high chrome, nitrogen steel alloy containing chromium, nitrogen ad, small amounts of manganese, nickel,, and carbon, balance being iron. No. 2,393,778. David Hull to Tennessee Eastman Corp.

Alkylation process which comprises reacting aromatic hydrocarbon with alkylating agent under alkylating conditions in contact with solution of aluminum halide catalyst in a nitroparaffin and containing inert salt selected from alkali and alkaline earth metal chlorides and bromides, etc. No. 2,393,818. Louis Schmerling to Universal Oil Products Co.

Methylaminomethyl-(3-amino-4-hydroxy-phenyl)-carbinol and salts thereof. No. 2,393,820. Otto Schnider to Hoffmann-La Roche Inc.

Polyamines. No. 2,393,825. Murray Senkus to Commercial Solvents Corp.

1,3,7-triazabicyclo (3.3.0) octanes. No. 2,393,826. Murray Senkus to Commercial Solvents Corp.

Ethers of secondary nitroalkanes and method of preparing them. No. 2,393,827. Murray Senkus to Commercial Solvents Corp.

Separating pure meta-xylene from oil comprising mixture of xylenes in-

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All along the line, wherever crushed, powdered, or granulated chemicals are handled or used, Raymond Multi-Wall Paper Shipping Sacks solve the container problem. They save packing and handling time, curtail losses from seepage, tears, sifting, and rough usage. They are water-resistant.

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THE RAYMOND BAG COMPANY
MIDDLETOWN, OHIO

cluding meta-xylene. No. 2,393,888. Percy Cole to Allied Chemical & Dye Corp.

Preparation of N,M'-dicycloaliphatic-p-phenylene-diamines. No. 2,393,889. Elmer Cook and William Thomas, Jr. to American Cyanamid Co.

Separating camphene from terpene mixture comprising camphene and pinene, comprising converting pinene to dipentene by heating mixture in presence of dissolved catalyst having alkaline reaction and distilling. No. 2,393,894. Nicholas Farinacci and William Kirkpatrick to Hercules Powder Co.

Selectively separating propylene and ethylene from normally gaseous mixture of hydrocarbons. No. 2,393,895. James Fleming to The Texas Co.

Producing a menthadiene from a bicyclic terpene selected from pinene and carene which comprises heating bicyclic terpene above boiling point in presence of dissolved catalyst having alkaline reaction. No. 2,393,915. William Kirkpatrick to Hercules Powder Co.

Making thiourea from hydrogen sulfide. No. 2,393,917. William Lewis to Monsanto Chemical Co.

Omega-alkoxyalkyl ethers of diphenylamines. No. 2,393,930. Robert Parker and James Smith, Jr. to American Cyanamid Co.

N-n-butyl-3,6-endomethylene-4-cyclohexene-1,2-dicarboxylic imide. No. 2,393,999. Walter McCrone.

Soluble amidine salts. No. 2,394,003. George Newbery and Alexander Easson to May & Baker Ltd.

Producing citric acid comprising forming medium of carbohydrate selected from monosaccharides, disaccharides, starches, inulin and nutrient inorganic and nitrogen-containing substances, supplying thereto citric-acid-producing strains of Aspergillus wentii. No. 2,394,031. Selman Waksman and Edward Karow to Merck & Co. Inc.

Triazine derivatives. No. 2,394,042. Gaetano d'Alelio to General Electric Co.

Production of aromatic hydrocarbons from aliphatic hydrocarbons having 6-12 carbon atoms to molecule. No. 2,394,170. Aristid Grosse and William Mattox to Universal Oil Products Co.

Producing composition selected from alpha-amino acids and N-acyl-alpha-amino acids. No. 2,394,230. John Billman.

Producing alkali metal formylacetic ester which comprises reacting ester of acetic acid with ester of formic acid and alkali metal alcoholate under super-atmospheric pressure in atmosphere of carbon monoxide. No. 2,394,255. Elmore Northey to American Cyanamid Co.

Derivatives of glycols. No. 2,394,257. Robert Parker and John Denton to American Cyanamid Co.

Bromating organic acid of benzene and naphthalene series with bromine in aqueous medium which comprises adding alkali to transform organic acid into water soluble neutral salt, adding bromine, etc. No. 2,394,268. Cecil Spencer to American Cyanamid Co.

New compound composed of nucleus of two heterocyclic rings, selected from azine and azole nuclei and being joined through polyamine bridge attached to nuclear carbon atoms. No. 2,394,306. Winfrid Hentrich and Erik Schirm.

Producing nitroparaffins which comprises reacting nitric acid and paraffin and passing mixed gases through heated catalyst chamber packed with fragments of catalyst selected from compounds of arsenic and antimony. No. 2,394,315. Norman Levy to Imperial Chemical Industries Ltd.

Producing stable nonvolatile oil which comprises subjecting monohydrohalide of monocyclic terpene hydrocarbon to action of catalyst selected from aluminum chloride and boron trifluoride. No. 2,394,359. Joseph Borglin to Hercules Powder Co.

Continuously alkylating low boiling isoparaffin with normally gaseous olefin in presence of aluminum chloride alkylation catalyst. No. 2,394,368. Louis Clarke to The Texas Co.

Production of unsaturated oximes. No. 2,394,430. John Crowder and Glenn Nesty to The Solvay Process Co.

Neutral ester of a halo-aryloxy-substituted lower alcohol. No. 2,394,512. Gerald Coleman and Bartholdt Hadler to The Dow Chemical Co.

Manufacture of amines, process favoring production of high ratio of polyalkyl amine to mono-alkyl amine. No. 2,394,515. Roland Goshorn to Sharples Chemicals Inc.

Manufacture of amines, process favoring production of a high ratio of poly-alkyl amine to mono-alkyl amine. No. 2,394,516. Roland Goshorn to Sharples Chemicals Inc.

Nitriles and method of making the same. No. 2,394,520. Joy Lichty to Wingfoot Corp.

Preparing substituted guanamines having structural formula R—G, in which G is guanamine radical, R is aliphatic radical having a "negative substituent" in hydrocarbon chain, and bond between R and G is carbon to carbon bond. No. 2,394,526. Jack Thurston to American Cyanamid Co.

Azomethines. No. 2,394,530. Herman Bruson and Thomas Riener to The Resinous Products & Chemical Co.

3-keto-5,6-Dibromo-etio-cholanyl-methyl-diphenyl-ethylene, having molecular formula $C_{34}H_{40}OBR_2$, and having melting point of 173° C. No. 2,394,551. Percy Julian and John Cole to The Glidden Co.

Decolorizing colored monomeric acid from acrylic acid and alpha-alkacrylic acids, color of monomeric acid being caused by presence of colored oxidation products of phenolic polymerization inhibitors, comprising treating with aqueous solution of alkali metal bisulfite. No. 2,394,572. William Utermohlen, Jr. to Eastman Kodak Co.

Thiocyanoacetate of 3,5-endoethylene hydroxycyclopentanoindane. No. 2,394,583. Herman Bruson to The Resinous Products & Chemical Co.

Thiocyano-acetic acid ester of hydroxydihydronordicyclopentadiene. No. 2,394,584. Herman Bruson to The Resinous Products & Chemical Co.

Electrolytically reducing compound from N-aralkylidene-p-aminophenols and N-furfurylidene-p-aminophenol to produce N-aralkyl-p-aminophenols and N-furfuryl-p-aminophenol in diaphragm-containing electrolytic cell. No. 2,394,587. Frederic Bean to Eastman Kodak Co.

Insaturated derivatives of carbamic acid. No. 2,394,592. Albert Chenicek to Pittsburgh Plate Glass Co.

Preparing aliphatic diisocyanate comprising heating, in presence of agent from phosgene and thionyl chloride, a dihydroxamic compound. No. 2,394,597. Joseph Dickey, James Straley and Theodore Stanin to Eastman Kodak Co.

Obtaining sterol and the like from tall oil. No. 2,394,615. John Jenkins to Pittsburgh Plate Glass Co.

Manufacture of conjugated diolefin from corresponding paraffin. No. 2,394,625. Maryan Matuszak to Phillips Petroleum Co.

Silicic acid esters. No. 2,394,642. Franklin Strain, Albert Chenicek and Irving Muskat to Pittsburgh Plate Glass Co.

Manufacture of alpha-chloro-beta-hydroxy propionitrile by action of gaseous chlorine upon acrylo-nitrile in presence of water characterized by completely suppressing formation of alpha-beta-dichloro-proprionitrile. No. 2,394,644. Karl Tuerck and Hans Lichtenstein to The Distillers Co. Ltd.

Producing quinolinic acid nitrate comprising adding dinitro-8-quinolinol to nitric acid. No. 2,394,650. Adolph Zimmerli.

Making acetophenone which comprises passing mixture of styrene halohydrin vapor and steam into contact with basically reacting surface catalyst. No. 2,394,674. William Emerson to Monsanto Chemical Co.

Obtaining low sulphur diisobutylene formed by contacting C4 fraction from stabilization of cracked gasoline distillate with sulphuric acid and separating from C4 fraction, constituents boiling above boiling point of C4 hydrocarbons containing diisobutylene. No. 2,394,678. Milton Frankel and Meyer Agruss to The Pure Oil Co.

Preparing tetraalkyl cyclohexane hydrocarbon, which comprises subjecting to destructive hydrogenation. No. 2,394,691. Vladimir Ipatieff and Herman Pines to Universal Oil Products.

Simultaneous isomerization of normal butane and higher boiling saturated hydrocarbon. No. 2,394,694. Elmer Kanhofer to Universal Oil Products Co.

2,4-Di-(alpha-phenylethyl) phenol and 2,6-di-(alpha-phenylethyl) phenol. No. 2,394,754. Gaetano D'Alelio to General Electric Co.

Alcoholysis of alkamine esters of diaryl hydroxyacetic acids. No. 2,394,770. Arthur Hill and Roger Holms to American Cyanamid Co.

Production of an unsaturated phosphoric acid ester. No. 2,394,829. Lynwood Whitehill and Robert Barker to Shell Development Co.

Mixture of unsaturated branched chain aliphatic alcohols. No. 2,394,848. Thomas Doumani to Union Oil Co. of California.

Producing sulfonated higher alkyl derivatives of aromatic hydrocarbons. No. 2,394,851. Lawrence Flett to Allied Chemical & Dye Corp.

Obtaining reaction products of 1,3-dioxolane containing structural group $-CH_2OCH_2CH_2O-$. No. 2,394,862. Donald Loder and William Gresham to E. I. du Pont de Nemours & Co.

Halogenated mixture of amides formed from mixture of saturated monocarboxylic acids containing 2 to 5 cycloaliphatic rings per molecule. No. 2,394,871. John Perrine to Sun Oil Co.

Rendering harmless an organic poison gas in the air, comprising contacting air contaminated with organic poison gas with organic peroxide on carrier. No. 2,394,887. Ernst Berl.

Hydrocarbon sulphon-N-chloramide. No. 2,394,902. Max Engelmann to E. I. du Pont de Nemours & Co.

Producing monoalkyl benzene in which alkyl group has two to four carbon atoms. No. 2,394,905. Frederick Frey to Phillips Petroleum Co.

Halogen substituted acetonitriles. No. 2,394,912. Ingenuin Hechenbleikner to American Cyanamid Co.

Chemical individual selected from naphthyl methyl thiocyanate and naphthyl methyl isothiocyanate. No. 2,394,915. Franklin Jones to American Chemical Paint Co.

Reacting in presence of strongly basic quaternary ammonium hydroxide acrylonitrile and ester of acetoacetic acid. No. 2,394,962. Herman Bruson to The Resinous Products & Chemical Co.

Producing 2-aminopyrazine which comprises mixing in liquid ammonia pyrazine and alkali metal amide. No. 2,394,963. Moses Crossley and Jackson English to American Cyanamid Co.

Preparing alkyl esters of alpha-formylphenaceturic acid which comprises subjecting alkyl ester of phenaceturic acid to alkyl formate and sodium alkoxide in inert, anhydrous organic solvent. No. 2,394,967. Samuel Kushner to American Cyanamid Co.

Treating fatty oil to effect separation thereof into plurality of fractions having different properties. No. 2,394,968. Leo Van Orden to The M. W. Kellogg Co.

Paints, Pigments

Making pigment of non-leafing aluminum paste from normally-leafing aluminum powder while retaining shape and size of aluminum particles, which comprises combining without grinding a deleafing agent selected from highly polar alcohols, esters, ketones and aldehydes, a hydrocarbon thinner and normally-leafing aluminum powder. No. 2,393,731. Gordon Babcock to Reynolds Metals Co.

Textile printing composition comprising emulsion having inner aqueous phase comprising 20% of emulsion, and outer organic phase comprising pigment dispersed in vehicle consisting of solution of synthetic rubber obtained by copolymerizing butadiene and acrylonitrile in volatile organic solvent, in combination with vulcanizing agents. No. 2,394,542. David Gans to International Chemical Corp.

Textile printing composition comprising emulsion having inner aqueous phase, and outer organic phase comprising pigment dispersed in solution of polychloroprene in volatile organic solvent. No. 2,394,543. David Gans to Interchemical Corp.

Paper, Pulp

Converting wood pulp board to form for esterification which comprises subjecting wood pulp board while containing 60% water directly to violent blast of compressed air to cause blowing apart of fibers of cellulose pulp. No. 2,393,783. Donald Kridel to Eastman Kodak Co.

Improving processing of regenerated cellulosic products from chemically prepared wood pulp which comprises adding prior to completion of shredding the alkali cellulose a polymerized compound. No. 2,393,817. Paul Schlosser and Kenneth Gray to Rayonier Inc.

Defibering paper impregnated with cured acid-curing resin selected from melamine-aldehyde resins and urea and thiourea-aldehyde resins. No. 2,394,273. Walter Thomas to American Cyanamid Co.

Petroleum

Treating aqueous mudladen well drilling fluid comprising, subjecting well drilling fluid containing gel-forming component whose pH range is from 2.4 to 8.0 to action of organic tanning agent. No. 2,393,273. Truman Wayne.

Catalytic reforming of hydrocarbon mixtures which comprises contacting mixtures with catalyst comprising compound from chromites and molybdates of iron, cobalt and nickel precipitated on previously undried hydrous metal oxide gel. No. 2,393,288. Alva Byrns to Union Oil Co. of California.

Pyrolysis of fluid hydrocarbon material in which in heating period of cycle refractory heat storage material is heated by passage of hot combustion gases in contact therewith to establish a path of stored heat, etc. No. 2,393,333. Charles Milbourne to The United Gas Improvement Co.

Reclaiming mineral oils which have been used for lubrication of internal

combustion engine and which contain degradation products, which comprises heating used oil with a phosphorus sulfide. No. 2,393,335. John Musselman to The Standard Oil Co.

Refining petroleum oils containing mercaptans. No. 2,393,476. Harold Messmore to Phillips Petroleum Co.

In isoparaffin-olefin alkylation conducted in presence of conc. sulfuric acid, step of adding to raw reaction product a phenol to prevent corrosion of distillation equipment. No. 2,393,531. John Hart to Standard Oil Development Co.

Well drilling mud, comprising aqueous dispersion of clay and solid particles of crystalline alkali-metal metaphosphate. No. 2,393,560. Everett Partridge to Hall Laboratories, Inc.

Production of aviation gasoline. No. 2,393,565. John Powers to Standard Oil Development Co.

Catalytic hydrocarbon conversion process wherein hydrocarbons are converted by contact with fluid catalyst melt comprising antimony trichloride and aluminum chloride, and liquid fraction comprising entrained antimony trichloride is separated from reaction products. No. 2,393,569. William Ross and George Carlson to Shell Development Co.

Converting heavy hydrocarbon oil into gasoline motor fuel. No. 2,393,636. Everett Johnson to Standard Oil Co.

Apparatus for analysis of soil gas for hydrocarbons indicative of petroleum deposits, comprising purifying train means for removing hydrogen and carbon monoxide from gas to be analyzed, combustion chamber, etc. No. 2,393,674. Wladimir Zaikowsky to Consolidated Engineering Corp.

Producing normally liquid isoparaffins boiling in motor fuel range from normal butane. No. 2,393,857. Frederick Frey to Phillips Petroleum Co.

Converting hydrocarbons in presence of uniformly, downwardly moving particle-form solid contact mass material with equal exposure of all portions of contact mass. No. 2,393,893. Louis Evans and Frederick Ray to Socony-Vacuum Oil Co. Inc.

Pumping of crude oil tending to deposit paraffin from well equipped with pump in region of producing formation, method of reducing or preventing paraffin deposition. No. 2,394,189. David Kaufman to Texaco Development Corp.

Effecting conversion of hydrocarbons involving reactions such as alkylation and isomerization by contact with aluminum halide hydrocarbon complex. No. 2,394,412. Preston Veltman to The Texas Co.

Catalytic reforming of petroleum naphthas which are rich in naphthenic hydrocarbons. No. 2,394,617. Paul Kuhl to Standard Oil Development Co.

Cracking hydrocarbons which comprises subjecting hydrocarbons to cracking conditions in presence of halogenated epoxy compound. No. 2,394,654. Richmond Bell, Hillis Folkins and Carlisle Thacker to The Pure Oil Co.

Removal of organic acids from cracked naphtha. No. 2,394,662. Elza Camp and David Walsh to Standard Oil Development Co.

Alkylation. No. 2,394,696. Reginald Kinnear, Harold Chamberlain, Jack McCanne, George Fails and John Gordon to Socony-Vacuum Oil Co. Inc.

Obtaining formation samples at different levels within a well, applying radiant energy such as gamma rays to samples, and measuring amount of radiant energy transmitted through as indication of the hydrocarbon content of samples. No. 2,394,703. Edward Lipson.

Reducing olefin content of olefinic gasoline containing C5 hydrocarbons. No. 2,394,716. Davis Read, Jr. to Universal Oil Products Co.

Production of high anti-knock volatile blending fuels which comprises forming isobutylene polymer, hydrogenating, and passing vapors in contact with chromium oxide catalyst supported upon alumina, and separating fraction consisting largely of neopentane. No. 2,394,743. Ingolfur Gergsteinsson to Shell Development Co.

Conversion of carbonaceous materials wherein reactant vapors are contacted with catalyst susceptible to contamination by iron in presence of ferrous metal and catalyst is periodically regenerated in situ by oxidation of carbonaceous deposits, step of inhibiting contamination of catalyst by iron which comprises maintaining in feed less than 0.0009% sulfur. No. 2,394,750. Robert Cole and Irving Shultz to Shell Development Co.

Catalytic hydrogenation of sulphur-bearing aromatic hydrocarbon fractions to effect desulphurization thereof with no attack of aromatics. No. 2,394,751. Robert Cole to Shell Development Co.

Isomerizing saturated hydrocarbons which comprises contacting isomerizable saturated hydrocarbon under isomerizing conditions with fluid melt comprising aluminum, sodium and zinc chlorides. No. 2,394,752. Chester Crawford and William Ross to Shell Development Co.

Conversion of high-boiling hydrocarbons to gasoline by catalytic cracking which comprises contacting hydrocarbons with solid catalytic composition prepared by combining silica and alumina. No. 2,394,796. Milton Marisic to Socony-Vacuum Oil Co. Inc.

Production of blending fuel from saturated naphthenic gasoline. No. 2,394,797. Sumner McAllister and Norman Peery to Shell Development Co.

Isomerization process wherein vapors of saturated isomerizable hydrocarbon are passed through reaction zones containing supported isomerization catalyst of Friedel-Crafts type, which comprises maintaining in reacation zones a decreasing gradient of hydrogen in direction of flow. No. 2,394,803. Norman Peery to Shell Development Co.

Production of branched chain hydrocarbons, which comprises contacting normal butane with catalyst melt comprising aluminum chloride and antimony chloride. No. 2,394,810. William Ross to Shell Development Co.

Hydrocarbon conversion, comprising burning mixture of spent finely divided solid catalyst and hydrocarbon fuel to obtain mixture of regenerated catalyst and spent combustion gas containing no excess oxygen, etc. No. 2,394,849. Thomas Doumani and Clyde Berg to Union Oil Co. of California.

Isomerizing saturated hydrocarbons which comprises contacting hydrocarbon with molten quaternary mixture comprising aluminum chloride, sodium chloride, potassium chloride and zinc chloride. No. 2,394,898. Harry Cheney and Frank McMillan to Shell Development Co.

Producing normally liquid isoparaffinic hydrocarbons from lower boiling normal paraffin hydrocarbons. No. 2,394,906. Frederick Frey to Phillips Petroleum Co.

Continuous alkylation of hydrocarbons in presence of concentrated hydrofluoric acid as alkylation catalyst. No. 2,394,929. Maryan Matuszak to Phillips Petroleum Co.

Photographic

Photographic silver halide emulsion containing polymeric sensitizing dye having molecules of cyanine dye salt linked together through heterocyclic nitrogen atom terminal to conjugated chain of atoms of each by hydrocarbon radical, etc. No. 2,393,351. Cyril Wilson to E. I. du Pont de Nemours & Co.

Photo-template comprising rigid base having oil primer in contact therewith, superimposed upon primer a transfer lacquer, a photo-sensitive emulsion cemented thereto, and mild alkaline material incorporated between metal and photo-sensitive emulsion. No. 2,393,583. Ladislaus Balassa and Ronald McGlone to E. I. du Pont de Nemours & Co.

Forming color correction image in multi-layer film carrying superposed silver halide emulsion layers each sensitive to only one of primary colors, and free of coupler compounds, and silver halide emulsion masking layer, etc. No. 2,393,756. Le Roy Dearing to Eastman Kodak Co.

Gelatino-silver halide emulsion containing fog-inhibiting amount of hydroxy benzamide. No. 2,393,763. George Fallesen and John Leermakers to Eastman Kodak Co.

Producing cross-hairs, graticules, with fine lines on surfaces, which comprises coating surface with light-sensitive chromate colloid layer selected from fish glue, casein and gelatin, exposing layer to light-projected image of fine lines, subjecting exposed areas to tannic acid-containing substance, and to heat-carbonizing treatment. No. 2,393,821. Andre Schoen and Letha Patterson to General Aniline & Film Corp.

Photographic material comprising silver halide gelatin emulsion in contact with member of sulfinic acid, a seleninic acid and their salts, and a sulfoxide compound selected from aromatic and heterocyclic sulfoxide compounds. No. 2,394,198. Fritz Mueller to General Aniline & Film Corp.

Paper having sizing including melamine resin and aluminum salt of a monobasic acid, paper being free of polyvalent inorganic acid ions, and photographic silver halide emulsion coating applied on. No. 2,394,289. Fred Boughton to Eastman Kodak Co.

Color photography which comprises developing reducible silver salt image in presence of dye intermediate taken from basic N-substituted 1-amino-5-naphthols and basic N-substituted 1-amino-8-naphthols, etc. No. 2,394,527. David Woodward to E. I. du Pont de Nemours & Co.

Photographic developer containing developing agent and monosodium derivative of a hexahydric alcohol as an alkali. No. 2,394,588. Frederic Bean to Eastman Kodak Co.

Reducing fog produced upon development of silver halide emulsion which comprises developing emulsion in presence of chloroacetamide. No. 2,394,600. George Fallesen and John Leermakers to Eastman Kodak Co.

Polymers

Linear chain olefinic polymer characterized by molecular weight within 15,000 to 500,000 and iodine number within 0.001 and 50 in combination with curing agent comprising substance containing quinonoid nucleus. No. 2,393,321. Joseph Haworth to Jasco, Inc.

Polymerizing butadiene mixture in aqueous emulsion form by application of emulsifier and polymerization catalyst to yield solid polymer emulsion in water, and coagulating emulsion by adding a brine solution. No. 2,393,348. Wendell Waterman and Byron Vanderbilt to Jasco, Inc.

Producing monolithic, laminated, molded plastic product which consists of impregnating sheets of porous fabric with volatile solution containing cellulose derivative and solvent, stretching one of sheets over matrix formed to shape surface of product, and successively superposing additional of impregnated sheets. No. 2,393,437. Zachary Walter.

Forming Polymer product which comprises copolymerizing alkyl ester of acrylic acid and isoprene in an aqueous emulsion containing a caseinate and a peroxide catalyst. No. 2,393,438. Samuel Weisberg, Edwin Stimpson and Joseph Greenspan to Sealtest, Inc.

Homogeneous composition comprising polyvinyl chloride and glycerol di (cresylic acid) ether. No. 2,393,512. Franklin Bent and Kenneth Marple to Shell Development Co.

Composition comprising polyvinyl acetal resin and diglycerol trialkyl ether. No. 2,393,513. Franklin Bent and Kenneth Marple to Shell Development Co.

Non-resinous norpolycyclopentenones, having as one terminal cycle an endoethylene cyclopentano ring containing carbonyl group and as opposite terminal cycle a cyclopenteno ring. No. 2,393,607. Herman Bruson to The Resinous Products & Chemical Co.

Dihydronordicyclopentadienyl mono-ethers of polyhydric alcohols. No. 2,393,609. Herman Bruson to The Resinous Products & Chemical Co.

Polydihydronordicyclopentadienyl ethers. No. 2,393,610. Herman Bruson to The Resinous Products & Chemical Co.

Curing agent capable of accelerating curing of acid-curing thermosetting resin, said curing agent being soluble, fusible product of reaction of ingredients including aldehyde and diazinyl carboxy-alkyl sulphide. No. 2,393,753. Gaetano D'Alelio and James Underwood to General Electric Co.

Cellulose organic acid ester plastic comprising cellulose organic acid ester whose acyl groups contain from 2 to 4 carbon atoms, a plasticizer therefor, and, for inhibiting deterioration of plastic by ultra-violet light, resacetophenone. No. 2,393,794. Lester Meyer and William Gearhart to Eastman Kodak Co.

Cellulose organic acid ester plastic comprising cellulose organic acid ester, a plasticizer therefor, and, for inhibiting deterioration of plastic by ultra-violet light, a 3-alkyl-2-phenylimino benzothiazoline. No. 2,393,801. Donald Morey and Robert Tichenor to Eastman Kodak Co.

Cellulose organic acid ester plastic comprising cellulose organic acid ester, plasticizer therefor, and, for inhibiting deterioration of plastic by ultraviolet light, NN'-diphenyl acetamidine. No. 2,393,802. Donald Morey and Robert Tichenor to Eastman Kodak Co.

Antistatic composition for surface of vinyl resin to decrease accumulation of static electricity thereon, said film comprising polyethylene glycol of such high average molecular weight as to be normally solid. No. 2,393,863. Clayton Myers to Bakelite Corp.

Production of resin from acid-refining residue. No. 2,393,913. Wilbert King and Julius Kleiner and John Clark to Allied Chemical & Dye Corp.

Hard surfaced, flexible facing sheet having varnish and cement adherent surfaces, comprising 1-4 ply asbestos paper impregnated and bonded with heat and pressure cured phenolic resin, said resin containing tricresyl phosphate. No. 2,393,947. Manuel Ximenez to Johns-Manville Corp.

Polymerizing tetrafluoroethylene. No. 2,393,967. Merlin Brubaker to E. I. du Pont de Nemours & Co.

From Official Gazette—Vol. 582, Nos. 4, 5—Vol. 583, Nos. 1, 2 (Jan. 22-Feb. 12)—p. 676

Preparing from polyamide an insolubilized infusible shaped article, comprising reacting mixture yielding liquid product which gels on standing and consisting of formaldehyde and homogeneous solution, in oxygen-containing organic acid, of a linear polyamide. No. 2,393,972. Theodore Cairns to E. I. du Pont de Nemours & Co.

Material having waterproofed paper surface and member adhesively joined to surface with film of diisocyanate treated synthetic linear polyester-amide. No. 2,393,987. Jesse Harmon to E. I. du Pont de Nemours & Co.

Making synthetic resin similar to phenol-aldehyde resins, step of liberating aldehydes and ketones from ligno-cellulosic material by acid-hydrolysis in presence of live steam under pressure and simultaneously reacting phenol with liberated aldehydes and ketones. No. 2,394,000. Thomas McElhinney to William Gibbens, Jr.

Treating non-fibrous cellulosic films which comprises impregnating non-fibrous cellulosic film of regenerated cellulose with acidic, aqueous, colloidal solution containing partially polymerized melamine-formaldehyde condensation product, introducing plasticizing agent into film, drying, and applying water-repellent coating composition. No. 2,394,-009. John Pollard to American Cyanamid Co.

Producing unmasticated reinforced copolymer from polymerizable material comprising butadiene and isobutylene. No. 2,394,025. Theodore Te Grotenhuis.

Polymerizing tetrafluoroethylene which comprises heating tetrafluoroethylene in presence of water and catalyst of oxygen and organic peroxy compounds. No. 2,394,243. Robert Joyce, Jr. to E. I. du Pont de Nemours & Co.

Production of resin solid at room temperature by polymerization of amylene--containing light oil isoprene fraction obtained from light oil produced in vapor phase pyrolysis of petroleum oil and containing isoprene as preponderant diolefine present therein, said fraction being free from preponderant part of cyclopentadiene originally present. No. 2,394,266. Frank Soday to The United Gas Improvement Co.

Preparing dispersions of polymerized chloro-2-butadiene-1, 3. No. 2,394,-291. William Calcott and Howard Starkweather to E. I. du Pont de Nemours & Co.

Polymerizing 2-chloro-1, 3-butadiene in aqueous emulsion in presence of sulfur, which comprises starting polymerization in contact with normal atmospheric oxygen and increasing rate of polymerization by decreasing amount of molecular oxygen in contact. No. 2,394,347. Frank Wilder to E. I. du Pont de Nemours & Co.

Polymerizing mixture of monomeric materials comprising butadiene-1, 3 hydrocarbon, vinylidene chloride and polymerizable acrylic compound containing single olefinic double bond linking methylene (CH_2) group and carbon atom. No. 2,394,406. Frank Schoenfeld to The B. F. Goodrich Co.

Polymerization of aromatic olefin material capable of being polymerized by heat, which comprises polymerizing material by radiant heat, major portion of which is of infra red radiation of wave length from 10,000 to 20,000 Angstrom units. No. 2,394,407. Frank Soday to The United Gas Improvement Co.

Making decarboxylated and softened rosin product from hard and brittle rosin, which process comprises incorporation in rosin of metallic zinc, etc. No. 2,394,416. Harold Zeiss to Ridbo Laboratories, Inc.

Odor stabilized plastic composition, comprising vinyl resin which is conjoint polymer of vinyl chloride with vinyl acetate, and ester plasticizer for vinyl resin, stabilized against development of odor by incorporation of phthalic anhydride. No. 2,394,417. Victor Yngve, deceased, by Lauchlin Currie, executor, to Bakelite Corp.

Inhibiting color caused by partial decomposition by heat of polymeric vinyl resins containing combined vinyl halide, which comprises mixing polymeric resins with color-reducing substance from aliphatic alpha, beta-olefinic unsaturated carboxylic acids and their anhydrides. No. 2,394,418. William Quattlebaum, Jr. and Charles Noffsinger to Carbide and Carbon Chemicals Corp.

Sub-resinous esterification product. No. 2,394,432. Melvin De Groote and Bernhard Keiser to Petrolite Corp. Ltd.

Plastic composition comprising cellulose ester of a saturated straight-chain fatty acid with 2 to 4 carbon atoms and as plasticizer a hexide diester the acyl radicals of which selected from radicals of acetic, propionic and butyric acids. No. 2,394,439. Rudolph Goepp, Jr. to Atlas Powder Co.

Hard resinous light-colored composition formed by reacting aromatic hydrocarbons having incompletely substituted benzene ring with chlorinated petroleum wax in presence of Friedel-Crafts catalyst, and adding metallic zinc and water to decolorize same. No. 2,394,560. Ferdinand Otto and Orland Reiff to Socony-Vacuum Oil Co. Inc.

Sulphurized phenolic composition formed by heating chlorinated petroleum wax to produce complex condensation product containing chlorine, dechlorinating product to cause unsaturation of aliphatic groups and heating condensation product with sulphur to vulcanize. No. 2,394,564. Orland Reiff and John Zech to Socony-Vacuum Oil Co. Inc.

Heating polymer of tetrafluoroethylene in presence of chlorine and separating reaction products. No. 2,394,581. Anthony Benning, Frederick Downing and Joseph Park to Kinetic Chemicals, Inc.

Preparing ethers of hydroxy-dihydronorpolycyclopentadiene having ether group on one terminal cycle and olefinic linkage in opposite terminal cycle. No. 2,394,582. Herman Bruson to The Resinous Products & Chemical Co.

Polymerization of cyclopentadiene, comprising mixing hydrocarbon solvent and surface active clay, slowly adding cyclopentadiene. No. 2,394,641. Frank Soday to The United Gas Improvement Co.

Condenser comprising pair of electrodes and dielectric film between electrodes of comminuted dielectric material in binder of polyvinyl alcohol. No. 2,394,670. Judson Detrick to Western Electric Co. Inc.

Manufacture of esters of fossil resins by direct reaction of undissolved, polymerized fossil resin and alcohol, selected from monohydric primary alcohols, monohydric secondary alcohols, and polyethylene glycols. No. 2,394,731. Karl Weber to Armstrong Cork Co.

Mixture of linear polymeric materials having substituted by sulfonic acid groups hydrogen on nuclear carbon of linear polymeric materials having chain of two to thirty. No. 2,394,761. Thomas Ford to E. I. du Pont de Nemours & Co.

Ether of polymeric polyhydric alcohol with 3-hydroxythiolane-1-dioxide. No. 2,394,776. William Hoffman and Carl Mortenson to E. I. du Pont de Nemours & Co.

A 1, 3-dioxolane-alkylene oxide interpolymer, alkylene group containing less than 5 carbon atoms. No. 2,394,910. William Gresham to E. I. du Pont de Nemours & Co.

Improving processing characteristics of butadiene-styrene interpolymers containing styrene, which comprises incorporating in interpolymer a polyvalent metal salt of a terpene mercaptan. No. 2,394,952. John Vincent to E. I. du Pont de Nemours & Co.

Interpolymerizing ethylene with methyl methacrylate, which comprise charging stainless steel reaction vessel with de-aerated water, methyl methacrylate and benzoyl peroxide, adjusting to pH of 5.2 to 3.2 with formic acid and pressuring vessel with 600 atmospheres of ethylene containing oxygen. No. 2,394,960. Howard Young to E. I. du Pont de Nemours & Co.

Processes and Methods

Determining oxidizing value of oxygen-containing gas mixture. No. 2,393,362. Clarence Gerhold to Universal Oil Products Co.

Inductively heating material which is electrically non-conductive, to limited predetermined temperature below injurious decomposition of compound, which comprises associating therewith distributed ferromagnetic alloy particles. No. 2,393,541. Fred Kohler to Induction Heating Corp.

Recovering catalyst material by separating catalyst fines from coarser catalyst particles and agglomerating them to form larger attrition resistant catalyst particles which are returned to reaction zone. No. 2,393,554. Henry Ogorzaly to Standard Oil Development Co.

Determining etching power of etching solutions which comprises sand-blasting surface of test sample, determining translucence of sand-blasted test sample, dipping test sample for predetermined time in etching solution, determining translucence of test sample after dipping, etc. No. 2,393,684. Wilbur Hoff and Leon Shaw to Western Electric Co. Inc.

Removing combustible contaminants from a mass of incombustible subdivided solids. No. 2,393,839. Charles Thomas and John Pinkston, Jr. to Universal Oil Products Co.

Exothermic gas phase reaction wherein finely divided solid catalyst is contacted with mixture of carbon monoxide and hydrogen, and resulting heat of reaction tends to increase temperature beyond desired operating range, method of controlling temperature of exothermic reaction and of dissipating heat of reaction. No. 2,393,909. Everett Johnson to Standard Oil Co.

Separating wax-oil mixture wherein mixture is emulsified in liquid condition with heavier non-solvent liquid and resulting emulsion is cooled to partially solidify wax, which includes introducing partially solidified emulsion into solid-bowl centrifugal separator. No. 2,394,016. August Henry Schutte.

Flocculation of finely divided solid in aqueous suspension consisting in dispersing in suspension, material selected from water solution of water soluble portion of linseed and alkaline solution of alkali soluble portion of linseed. No. 2,394,083. Mark Lintz.

Method of indicating variations in consistency or turbidity characteristics of fluid material as solution or aqueous suspension which comprises connecting two photoelectric cells to operate indicater in accordance with variations in distribution of light between cells, immersing both cells in fluid material under test, etc. No. 2,394,129. Douglas West to Howard Smith Paper Mills Ltd.

Heat transfer method which comprises circulating molten metal salt mixture through confined zone in indirect heat exchange relationship with another fluid, cations of salts are of metals higher in electromotive series than metals of walls of confined zone, and effecting contact of circulating molten salt mixture with metal corresponding to one of said cations. No. 2,394,164. Clarence Gerhold to Universal Oil Products Co.

Detecting difference in colors which are close visual matches but not spectrophotometrically identical which comprises successively observing colors through series of filter pairs, each pair consisting of band pass colored filter and neutral filter, etc. No. 2,394,508. Robert Barnes to American Cyanamid Co.

Dehydrating spumiferous materials in which material is heated to ebulliency, adding fluoro-organic compound. No. 2,394,596. Garland Davis and John Zimmer to Standard Oil Development Co.

Concentrating solutions of salts having inverted solubility which comprises passing solution in thin layer over evaporator surface and passing hot gases concurrent with flow of solution and in direct contact with surface of solution. No. 2,394,643. Robert Switzer to Eastman Kodak Co.

Contacting fluid reactant with solid material which comprises introducing fluid reactant to lower portion of dense bed of subdivided solid contact material in contacting zone at sufficient velocity to maintain bed in turbulent fluid-like state, etc. No. 2,394,651. Joseph Alther to Universal Oil Products Co.

Preparing treating agent for removing weakly acidic bodies from organic, water-immiscible liquids which comprises preparing solution of high-boiling tar acids in aqueous alkali, and blowing solution with free oxygen-containing gas until color-imparting bodies contained can be readily extracted with liquid-low-boiling hydrocarbons. No. 2,394,652. Howard Alves and Byron MacKusick to The Pure Oil Co.

Regenerating finely divided solid catalyst containing hydrocarbonaceous deposits. No. 2,394,680. Clarence Gerhold and Lev Mekler to Universal Oil Products Co.

Process wherein mass of subdivided solid particles comprising combustible and non-combustible components is treated to effect removal of combustibles therefrom. No. 2,394,710. Jerry McAfee to Universal Oil Products Co.

Restoring activity of sulf-active catalyst consisting of pilled metal sulfide deteriorated by non-halogen-containing deposits which comprises treating catalyst in situ with sulfur dioxide and then flushing with hydrogen. No. 2,394,739. Raymond Archibald to Shell Development Co.

Stripping fluidized finely divided catalyst whereby tendency to short circuit or by-pass within a stripping zone is avoided. No. 2,394,814. John Snuggs to Standard Oil Co.

Contacting solids and gases wherein stream of reactants passes through reaction chamber containing dense mass of finely-divided contact material, etc. No. 394,928. Homer Martin, Eger Murphree, Edwin Gohr, and John Graham to Standard Oil Development Co.

Additional patents on all other classifications from the above volumes will be give next month.

Abstracts of Canadian Patents

Collected from Original Sources and Edited

Requests for further information or photostated copies of the patents reported below should be addressed to the Commissioner of Patents and Copyrights, Department Secretary of State, Ottawa, Canada.

CANADIAN PATENTS

Granted and Published Dec. 25, 1945

Treatment of cut surfaces of fruit for inhibiting discoloration, which comprises applying to the surface a thiosulphate solution that is substantially free from sulphur dioxide. No. 432,067. Eduard Elion.

Machine for coating a quantity of seed grain with chemical dust during the passage of the grain through the machine. No. 432,071. Sampson J. Goodfellow.

Unvulcanized rubber of increased plasticity comprising rubber admixed with a small amount of Di(N-morpholine methyl) sulphide. No. 432,100. American Cyanamid Co. (Russell T. Dean)

Composition comprising a material selected from the group consisting of rubber and synthetic rubber-like materials, plasticized with n-hexyl B-phenoxy propionate. No. 432,101. American Cyanamid Co. (Russell T. Dean)

Preparation of improved rutile titanium dioxide pigments which comprises calcining anatase titanium dioxide admixed with antimony oxide until completely converted to rutile titanium dioxide. No. 432,113. Canadian Titanium Pigments Ltd. (Robert William Ancrum)

Adhesively uniting materials by applying thereto hardenable aldehyde condensation products of aminotriazines, bringing together the materials to be united and treating them at a temperature substantially below 100° C. to harden the condensation products. No. 432,117. Ciba Products Corp. (Society of Chemical Industry, Gustav Widmer, Willi Fisch)

Improved method of producing magnesium and chlorine. No. 432,121. The Consolidated Mining and Smelting Co. of Canada, Ltd. (Robert B. MacMullin)

Method of producing a cellular heat cast refractory which comprises casting molten refractory mixed with zinc oxide. No. 432,124. Corhart Refractories Co. (Theodore Estes Field and Harold Thomas Smyth)

As a new compound, an isocyanate having the formula $C_{18}H_{37}S \cdot CH_2 \cdot N{=}C{=}O$. No. 432,147. Heberlein Patent Corp. (Walter Kaase and Ernst Waltmann)

Thermoplastic vulcanizate, comprising the reaction product of sulphur and a copolymer of a butadiene and a nuclear chlorinated styrene, containing about 5 per cent—40 per cent chlorine and about 10 per cent—50 per cent of sulphur by weight. No. 432,160. The Mathieson Alkali Works (Charles C. Clark)

Dehumidifying a fluid containing moistures, which comprises contacting fluid with thermally activated bauxite from which 68 per cent to 86 per cent of the combined moisture has been removed. No. 432,167. Porocel Corporation. (William A. La Lande, Jr.)

Naphthalene derivative. No. 432,174. Sandoz, A. G. (Oscar Knecht, Walter Wehrli, Fritz Uebersax and Jakob Böni).

Secondary ether of polyhydric alcohol. Shell Development Co. (Theodore W. Evans and Edwin F. Bullard)

Process for the manufacture of tire fabric. No. 432,207. Camille Dreyfus. (William Whitehead)

Granted and Published Jan. 1, 1946

Low density insulating fireboard having its surface hardened by a coating of size and an outer coating of a composition including a drying oil, a siliceous material, a filler, and a solvent. No. 432,220. Alfred Crustin.

Electric furnace for use with a chloride or a chloride-fluoride salt bath. Artemas F. Holden. No. 432,227.

Detecting cracks and defects in aluminum which comprises subjecting the surface to the action of a mineral acid, rinsing, treating the rinsed surface with a solution of organic dye and finally treating to remove therefrom surface held dye. No. 432,246. Aluminum Company of America. (Charles John Slunder)

Production of granular or globular polymerization products of methyl methacrylate by polymerizing the ester in admixture with water containing in solution approximately 0.1 to 10 per cent of polymeric sodium methacrylate. No. 432,263. Canadian Industries Ltd. (Archibald Renfrew, James Martyn Walter and William Elliott Frew Gates)

A filter medium comprising filaments of a vinyl resin, said filaments having been partially fused to add stiffness to the filter medium and to stabilize the porosity of the latter. No. 432,288. Carbide and Carbon Chemicals Ltd. (Edward W. Rugeley)

Electrolysis of magnesium chloride fusions. No. 432,289. The Consolidated Mining and Smelting Co. of Canada Ltd. (William C. Gardiner)

Production of 3-hydroxy-etio-allo-cholanone-(17). No. 432,307. Merck & Co., Inc. (Everett S. Wallis and Erhard Fernholz)

Composition having rot-proofing properties consisting of an oil in water emulsion which consists of a normally water insoluble toxic neutral metallic naphthenate dissolved in an oily volatile solvent. No. 432,310. National Processes Ltd. (Sydney George Barker)

Refractory coating material comprising zirconium silicate and titanium oxide in suspension with bentonite and dextrin in the presence of water and methylated spirit. No. 432,326. Henry Herbert York and William Michael Dummett.

Process for the production of hydrogenation compounds of the cyclopentano polyhydro phenanthrene series. No. 432,332. Pfeilring Werke A. G. (Lothar Strassberger, Ludwig Kraft)

Production of esters of transandrostandiol comprising subjecting an ester of dehydroandrosterone to the action of a reducing agent capable of saturating the double bond and of transforming the keto group into the secondary alcohol group. No. 432,333. Schering-Kahlbaum A. G. (Walter Schoeller)

Process for the manufacture of dihydrofollicle hormone and its unsaturated analogues dihydroequilin and dihydroequilenin, and their derivatives. No. 432,334. Walter Schoeller.

Conversion of a keto-compound of the cyclopentano-10, 13 dimethylpolyhydro-phenanthrene series into a corresponding hydroxyl compound. No. 432,335. Luigi Mamoli.

Manufacture of ketosteroids by subjecting steriods containing hydroxyl groups capable of dehydrogenation to the action of bio-chemical dehydrogenating agents, and isolating from the dehydrogenation mixture the keto steroids formed. No. 432,336. Henrich Koester, Luigi Mamoli and Alberto Vercellone.

Process for the manufacture of compounds suitable for the synthesis of the corpus luteum hormone. No. 432,337. Willy Logemann and Hans Dannenbaum.

Granted and Published Jan. 8, 1946

Sealing tape comprising a strip of backing material and a non-tacky coating of a thermoplastic and solvent-sensitive adhesive composition consisting of Ethyl cellulose, 1 part, Staybelite, 1 to 3 parts, Hercolyn, 0.5 to 1 part. No. 432,344. McLaurin-Jones Co. (Lewis Davis and Edwin C. Tuukkanen)

Electrochemical process subjecting an aluminum anode to 5-40 per cent by volume of hydrofluosilic acid at 40-100 degrees F and 6 to 40 volts to provide a surface finish emanating iridescent colours. No. 432,347. George Kraft and Nathan L. Solomon.

Extrusion moulding machine. No. 432,371. Charles Clayton Misfeldt.

Refractory comprising chromite having an augmentation of strength at intermediate temperatures by inclusion of a small amount of antimony oxide. No. 432,393. Basic Refractories, Inc. .(Robert A. Schoenlaub)

Synthetic composition consisting of the product of chemical interaction of formaldehyde and a partially hydrolyzed infusible, insoluble polymerized diallyl succinate. No. 432,401. Canadian General Electric Co., Ltd. (Gaetano F. D'Alelio)

Insulating composition comprising an insulating material and a binder of the ammonium salt of hydrogenated rosin. No. 432,426. Hercules Powder Co. (Clyde Hampton Boys)

Hog cholera vaccine comprising an aqueous composition containing hog cholera virus and a finely divided absorbing agent. No. 432,428. Lederle Laboratories, Inc. (Ralph W. G. Wyckoff)

In the alkylation of an isoparaffin with an olefin in the presence of a suitable catalyst, the improvement which comprises reacting together olefins containing propylene with the lower boiling portion of the alkylate produced in a prior stage of the alkylation process. No. 432,454. Standard Oil Development Co. (Charles E. Hemminger)

Composition for forming ceramic masses by slip casting procedures containing a major proportion of titanium dioxide, and 0.005 to 0.5 per cent of a sodium pyrophosphate having a formula between $Na_4P_2O_7$ and $Na_8P_4O_{13}$. No. 432,464. The Titanium Alloy Mfg. Co. (Eugene Wainer)

Method of separating water soluble and fat soluble vitamins. No. 432,478. American Dairies, Inc. and the Quaker Oats Co. (Joseph Chrisman)

Granted and Published Jan. 15, 1946

Protecting cheese from mould growth and loss of moisture by coating with a homogeneous mixture of wax and a reaction product by an alkylolamine with an acylating substance which replaces at least one but not all reactive acylatable hydrogen atoms of the class consisting of amino hydrogen and hydroxyl hydrogen with a lypophyllic group. No. 432,484. Harland H. Young and David Rubinstein.

Process of forming individual frangible soap tablets. No. 432,509. Edith A. Westerberg.

As a new compound, an alkoxyalkylol cyanamide of the formula, $N{\equiv}C{\cdot}NH{\cdot}R{\cdot}OH$ where R represents an alkoxyalkyl group. No. 432,513. American Cyanamid Co. (Walter P. Ericks)

Obtaining dry crystalline guanidine hydrochloride which comprises evaporating an aqueous solution thereof to dryness at temperatures not exceeding 160° C. No. 432,514. American Cyanamid Co. (David W. Jayne, Jr.)

Coagulating bath for alginate yarns consisting of a coagulating liquid, an emulsifying agent and an oil emulsified in the coagulating liquid. No. 432,527. Cefoil Limited. (John Bamber Speakman)

Regeneration method for sulphuric acid of 80-96 per cent H_2SO_4 content. No. 432.529. Chemical Construction Corp. (Nicolay Titlestad)

Process of decomposing sulphuric acid injecting the acid into a combustion supplied with fuel and with preheated air. No. 432,530. Chemical Construction Corp. (Frank J. Bartholomew)

Mothproofing composition containing magnesium silicofluoride and a lower alkanolamine silicofluoride in a ratio of about 1-3 to 1, respectively. No. 432,545. Hizone Products. (Hilton Ira Jones)

Process for preparing a provitamin A extract from palm oil. No. 432,567. National Oil Products Co. (Loran O. Buxton)

A solvent process of selectively separating a fraction which is rich in unsaturated glycerides from a material containing said glycerides. No. 432,568. National Oil Products Co. (Bernard Albert Dombrow)

Process for rendering fibrous textile material fast to slipping which comprises impregnating the material with a solution containing a compound of the general formula, $R_3\text{-}a\text{-}CH_2\text{-}R_1$. Society of Chemical Industry in Basle. (Otto Albrecht) 432,582.

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

419,013. The Drackett Co., Cincinnati, Ohio; filed Sept. 24, 1943; Serial No. 463,621; for cleansing drains; since Apr. 3, 1923.

419,016. Seydel-Woolley & Co., Atlanta, Ga.; filed May 16, 1944; Serial No. 470,317; for apparatus for conditioning yarn by spraying; since June 1941.

419,017. Koppers Co., Pittsburgh, Pa. assignor to Koppers Co. Inc., Pittsburgh, Pa.; filed Oct. 7, 1944; Serial No. 475,059; for coke; since Oct. 20, 1923.

419,024. J. N. Sharma, as Zenith Processing Co., Los Angeles, Calif.; filed Nov. 27, 1944; Serial No. 476,930; for protective coating for fresh citrus fruits; since Oct. 27, 1944.

419,036. Fred Bresee, Jr., as Balab, San Francisco, Calif.; filed Aug. 3, 1945; Serial No. 486,651; for foam depressant; since Jan. 21, 1941.

419,039. Solvent Manufacturing Co. Inc., Tulsa, Okla.; filed Aug. 14, 1945; Serial No. 487,146; for solvent as treatment of water conditions to remove scale and corrosion; since Apr. 8, 1944.

419,262. Fred'k A. Stresen-Reuter, Inc., Chicago, Ill.; filed Dec. 30, 1944; Serial No. 478,-094; for metallic soaps and solutions as driers in paints; since Dec. 12, 1944.

419,272. Brunswig Drug Co., Los Angeles, Calif.; filed June 18, 1945; Serial No. 484,663; for insect spray; since Sept. 1927.

419,284. Paisley Products, Inc., Chicago, Ill.; filed Sept. 20, 1945; Serial No. 488,772; for glue, paste, resin adhesives; since June 1, 1944.

471,616. The Ohio Chemical & Mfg. Co., Cleveland, Ohio; filed June 24, 1944; for meters for measuring flow of gases; since May 18, 1921.

472,255. Porocel Corp., Wilmington, Del., and Philadelphia, Pa.; filed July 14, 1944; for calcined bauxite; since Apr. 24, 1944.

474,092. Phillips Petroleum Co., Bartlesville, Okla.; filed Sept. 11, 1944; for thermo-plastic resins; since July 29, 1944.

474,155. Diamond Alkali Co., Pittsburgh, Pa.; filed Sept. 13, 1944; for chlorinated paraffin wax; since Aug. 26, 1944.

479,324. The Atlantic Refining Co., Philadelphia, Pa.; filed Feb. 2, 1945; for oil and grease adsorbent; since Aug. 22, 1944.

479,905. The Texas Co., N. Y.; filed Feb. 16, 1945; for lubricating greases; since Oct. 1, 1924.

480,208. L. Sonneborn Sons, Inc., N. Y.; filed Feb. 24, 1945; for liquid soap; since 1920.

480,240. International Chemical Co., Chicago, Ill.; filed Feb. 26, 1945; for general deodorant; since July 1, 1928.

480,714. The Parker Pen Co., Janesville, Wis.; filed Mar. 9, 1945; for writing ink; since Feb. 26, 1945.

482,870. Danbett Products Co., Hawthorne, Calif.; filed May 2, 1945; for cleaning preparation in crystal form; since Feb. 20, 1945.

483,742. Harry H. Rohloff, as Harry Rohloff & Co., Los Angeles, Calif.; filed May 24, 1945; for stains for coloring concrete; since Mar. 1, 1939.

484,986. L. Sonneborn Sons, Inc., N. Y.; filed June 23, 1945; for liquid resin composition for impregnating cotton fabrics; since Oct. 30, 1940.

485,092. Michigan Quartz Silica Co., Milwaukee, Wis.; filed June 27, 1945; for core and mold non-metallic mineral; since July 6, 1943.

485,235. Oxi Corp., Gary, Ind.; filed June 29, 1945; for soot, carbon, scale and slag remover; since June 12, 1945.

485,309. Roscoe S. Turner, as Turner and Horne, N. Y.; filed June 30, 1945; for removing stoppage in waste lines; since Feb. 1, 1940.

485,460. L. Sonneborn Sons, Inc., N. Y.; filed July 4, 1945; for composition of white mineral oil, petrolatum and paraffin wax; since Aug. 1, 1925.

486,193. Cuprinol, Inc., as Holco Chemical Co., Boston, Mass.; filed July 24, 1945; for preserving wood and fabric; since June 22, 1945.

486,212. John McQuade & Co. Inc., N. Y.; filed July 24, 1945; for plastic paints; since July 1936.

486,256. Hercules Powder Co., Wilmington, Del.; filed July 25, 1945; for carboxymethylcellulose; since July 13, 1945.

486,412. Hercules Powder Co., Wilmington, Del.; filed July 28, 1945; for chlorinated paraffin; since July 13, 1945.

486,722. The Rabin Co., Los Angeles, Calif.; filed Aug. 4, 1945; for cleaner; since June 27, 1945.

487,463. Hans J. Diem, as Southern Agricultural Insecticides, Hendersonville, N. C.; filed Aug. 23, 1945; for insecticides; since 1944.

487,572. Nuodex Products Co. Inc., Elizabeth, N. J.; filed Aug. 25, 1945; for wetting and dispersing agents; since June 1944.

488,026. Equipoise Controls, N. Y.; filed Sept. 6, 1945; for thermometers; since June 5, 1945.

488,102. International Lubricant Corp., New Orleans, La.; filed Sept. 7, 1945; for lubricating oils and greases; since Aug. 1941.

488,229. Meta Cine Co., Chattanooga, Tenn.; filed Sept. 10, 1945; for aluminum dihydroxy aminoacetate as antacid; since Mar. 31, 1945.

488,289. Stratosol Corp., N. Y.; filed Sept. 11, 1945; for insecticides; since Aug. 2, 1945.

488,337. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; for synthetic baking enamels; since July 1, 1939.

488,338. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; for plastic resin base primer for zinc; since Apr. 21, 1944.

488,340. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; for clear lacquers and lacquer enamels; since Dec. 15, 1937.

488,342. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; for synthetic resin varnishes; since July 1, 1929.

488,345. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; for colors and dyes; since Sept. 30, 1931.

488,438. Acetogen Associates, Inc., Detroit, Mich.; filed Sept. 14, 1945; for highly refined gas; since June 1944.

488,531. International Lubricant Corp., New Orleans, La.; filed Sept. 15, 1945; for lubricants; since May 1936.

488,879. York Pharmacal Co., St. Louis, Mo.; filed Sept. 22, 1945; for insecticides; since Sept. 5, 1945.

489,856. Eastman Kodak Co., Flemington, N. J. and Rochester, N. Y.; filed Oct. 12, 1945; for photographic developer; since June 25, 1945.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, Jan. 22-Feb. 12.

419,013

ANTI-FLY
419,272

HYTEX
479,905

485,235

200
486,722

COPLAST
488,338

DULAC
488,340

Paisley
SCIENTIFIC ADHESIVE SERVICE
419,284

SOLVEPINE
480,208

S A 50
487,463

DURAD
488,342

NIAGARA
TWIST-SETTER
419,016

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471,616

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KOPPERS
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THYON
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SAND-TEX
486,212

ALGLYN
488,229

BUBBLE-BREAKER
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474,155

RESTEX
484,986

"BANG"
488,879

Easy Clean
419,039

486,256
486,412

STRATOSOL
488,289

OCTOATE
419,262

ULTRASORB
479,324

SAN-A-WASH
485,092

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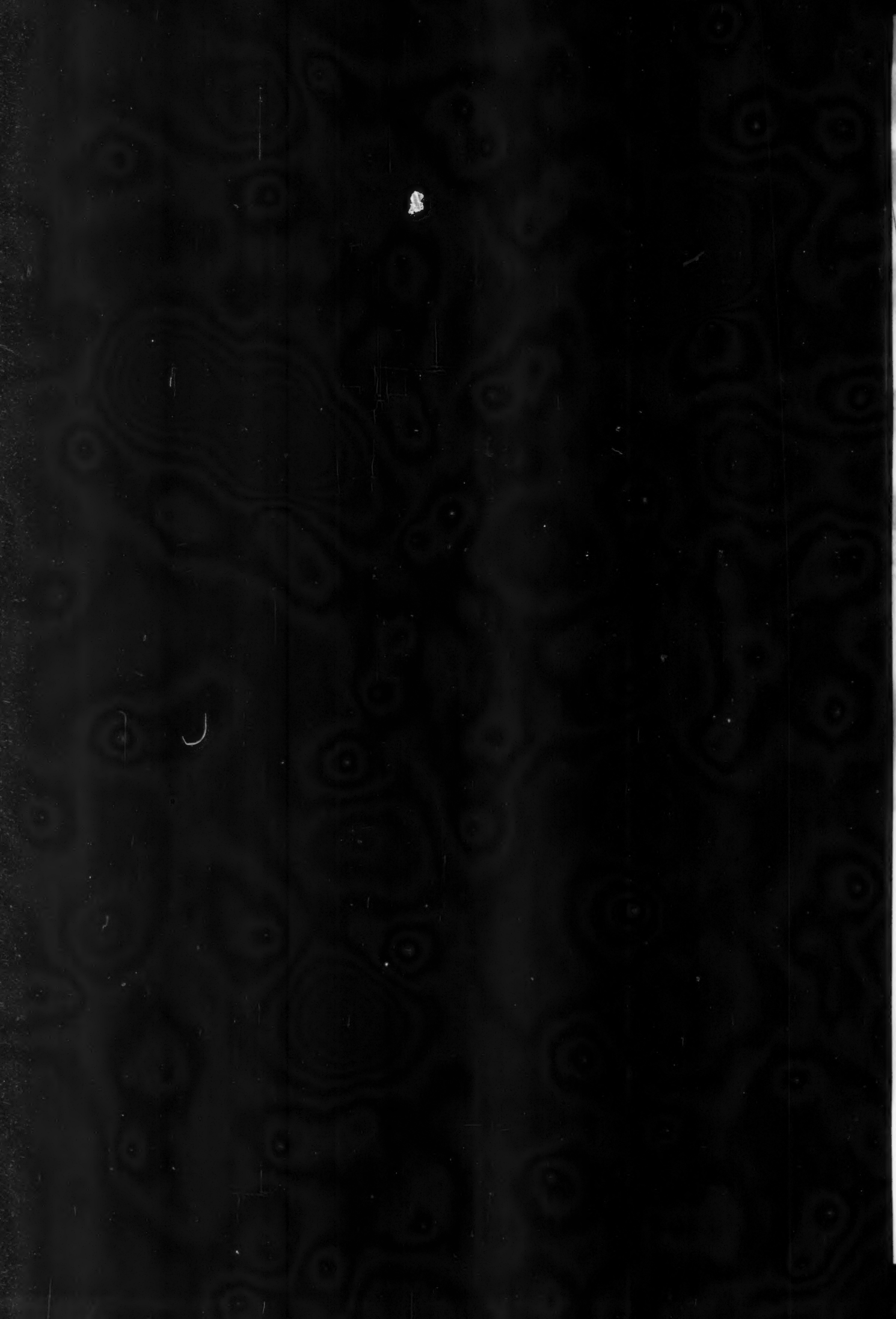

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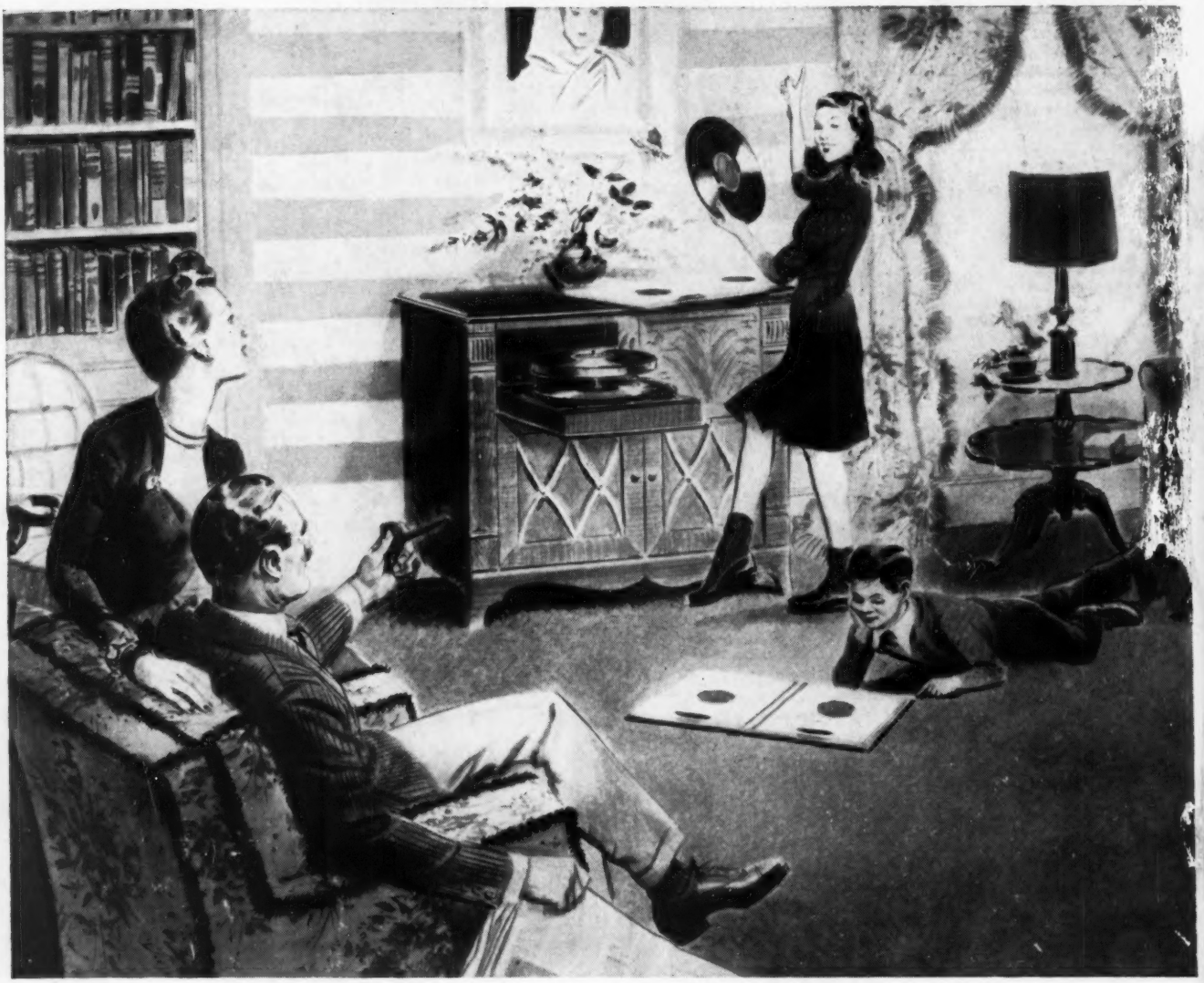

A "SOUND" IDEA FOR RECORD PERFORMANCE

Everything that contributes to greater enjoyment of music is welcomed with open arms by millions of Americans. That is why the new plastic phonograph records are an instant hit. They reproduce the music of great artists and orchestras with truly amazing range, clarity and fidelity—and without a "scratch" or other surface noises.

Making such records is a precision, mass-production job requiring fine molds of great accuracy. One part of the plastic molding process—releasing the pressings from the mold—is greatly facilitated by the use of stearates or metallic soaps, employed as dusting materials, mold lubricants, and processing aids because of their fine silky texture.

And it is these same properties, plus others equally interesting, that are making this group of chemicals highly useful in a variety of industrial processes. For example, they are being used widely in making special oils and greases, because of their "bodying" qualities. They are also used as mold lubricants in the manufacture of rubber products, and they impart desired adhesive qualities to face powders..."flatness" and anti-settling characteristics to paints...water resistance to fabrics and to concrete, brick and stucco.

Increasing the quality and utility of stearates is one of the many projects in which Witco Chemical Company is actively engaged. Through research and expanding production facilities, Witco has helped to make aluminum, zinc, magnesium, calcium and barium stearates the versatile "tools" of progress they are today. This is part of the broad service in chemicals, oils, pigments, waxes and asphalt specialties Witco offers to the rubber, paint, printing ink, plastic and other industries. If you have a material problem in these fields, Witco's modern technical service and research facilities can give you reliable assistance.

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